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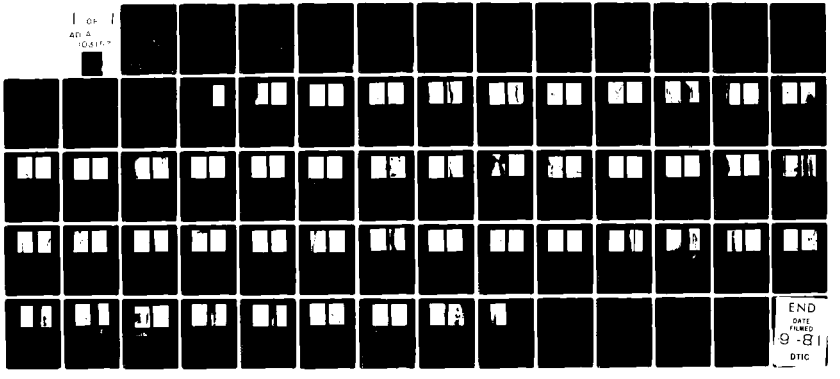

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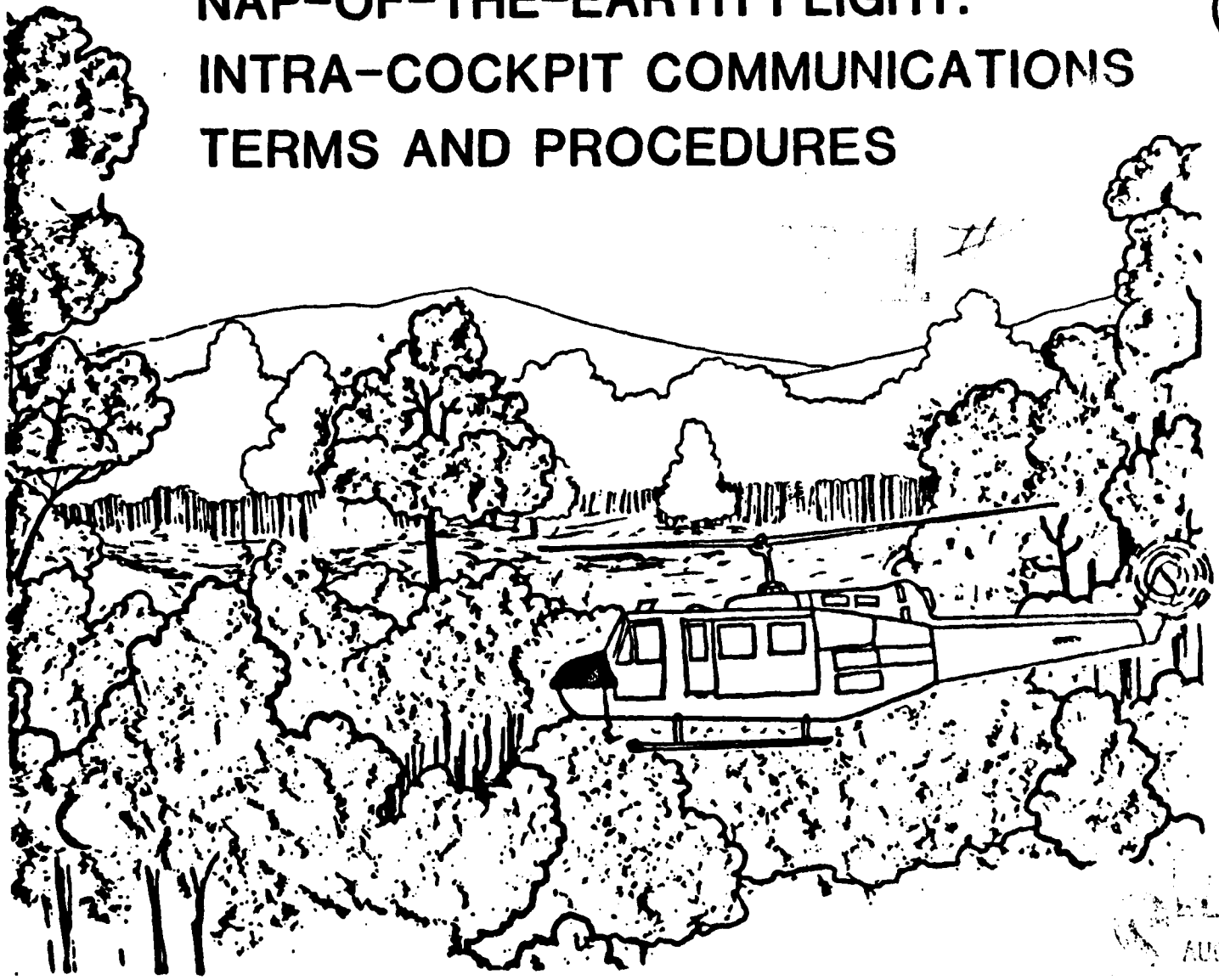

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NAP-OF-THE-EARTH FLIGHT: INTRA-COCKPIT COMMUNICATIONS TERMS AND PROCEDURES

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1.0 INTRODUCTION

1.1 Purpose of the List of Terms and Procedures

Effective communication between pilot and navigator is essential for successful navigation at nap-of-the-earth (NOE) altitudes. Map and ground features must be related quickly and accurately in this above-average stressful operating mode. The use of ambiguous or unfamiliar terms is a prime cause of poor communication which, in turn, can be the cause of errors and accidents in flying. Recent studies have demonstrated that flying and navigation performance can be improved with the use of agreed upon terminology. This guideline provides standardized words and phrases for intra-cockpit use, thereby improving NOE flying, especially during high workload situations.

1.2 How to Use the Document

Section 2 of the document presents general guidelines and procedures to aid NOE crewmembers in formulating navigation directions and terrain descriptive statements utilizing preferred terms and phrases for intra-cockpit communication. An alphabetical index is provided at the end of this document as a convenience in locating terrain descriptive terms or procedures.

Each preferred terrain descriptor is briefly defined from the viewpoint of how a crewman might observe the feature from a helicopter at NOE altitudes, rather than from a conventional dictionary definition. Wherever possible, military maps and actual photographs, both in full color, are included with the definitions as an aid in correlating and remembering the term.

The terms and phrases described herein are considered to be those most frequently needed while flying NOE over the following types of terrain: rolling countryside, hilly, mountainous, swampy, desert, coastal and snow covered areas.

The preferred terms for use during NOE flying appear in Section 3 under four headings: Navigation Directions, Terrain Locators, Terrain Descriptor Modifiers and Terrain Descriptors. Also in this section is a brief discussion on the use of additional or special terms.

The aviator should become familiar with these terms and procedures, first in Initial Entry Rotary Wing (IERW) training and thereafter through actual use in flight and periodic personal review. Rated aviators should also periodically update their familiarity with the terms and

procedures in order to improve and "standardize" their intra-cockpit NOE communications. Finally, newly formed crews, especially upon transfer to a unit in a different geographic area, should review the preferred terms together prior to their NOE missions.

1.3 How the List of Terms and Procedures Was Developed

Recordings of NOE intra-cockpit communications at various major Army helicopter installations across the U.S. were made and analyzed in order to develop this list of terms. The recordings were made during actual NOE flights and in specially designed map exercises with experienced aircrews and instructor pilots. Each sentence of every communication was analyzed and the terms were classified into three basic categories:

- Navigation Directions—Words and phrases utilized to convey heading, airspeed, and altitude information
- Terrain Locators—Words and phrases utilized to describe where the feature is relative to the aircraft (distance forward or laterally left/right) or relative to a ground reference point
- Terrain Descriptors—Words and phrases utilized to describe natural and man-made features

As one would expect, different words were sometimes used by different aviators to describe the same things. The preferred terms were selected on the basis of various factors including frequency of use, degree of standardization in general meaning, familiarity, absence of ambiguity in meaning, and absence of potential confusion with similar-sounding terms.

2.0 GUIDE TO IMPROVING NOE INTRA-COCKPIT COMMUNICATION

2.1 Piloting and Navigating

NOE flight requires an exchange of terrain and map information between the crewmembers. The crewmember navigating, referred throughout this document as the navigator, furnishes the pilot with the map and terrain information required to remain on course. The crewmember serving as pilot aids navigation by reporting recognizable terrain or man-made features that could appear on the route map. Both crewmembers face special difficulties because the flat visual angle associated with NOE flying produces apparent distortion in shapes compared to the map. Vertical relief becomes a primary means for identifying terrain features. In part, NOE flight is characterized by flying past a series of consecutive checkpoints, so crewmembers must recognize the terrain features as seen in vertical relief at flat visual angles. Typical navigation statements combine the use of present or anticipated terrain features and turning instructions. It is essential that the terms used have the same meaning to all crewmembers. Navigation statements should be clear, complete and concise.

2.2 Formulating Statements by the Piloting Crewmember

The pilot's primary responsibility during NOE is to "fly" the aircraft, i.e., maintain control of the aircraft while piloting it over the desired NOE route. He/she must also help keep the navigator informed of the key surrounding terrain and man-made features and enroute checkpoints. The reporting of this type of information aids in keeping the navigator oriented with respect to present aircraft position and over the desired NOE route. Based upon what the pilot is seeing and reporting, the navigator can then provide further navigation instructions.

The terrain feature information that the pilot reports should be stated in small increments without being excessively wordy. Excessive use of words or a continual stream of descriptions can be confusing. On the other hand, when a pilot does not provide enough feedback to the navigator, it enhances the probability that the navigator will become disoriented.

To help insure correct orientation, the pilot should report not only the visual acquisition of features described by the navigator but also unmentioned prominent features, that could appear on the map.

The navigation information provided by the pilot should always contain, at a minimum, the following two elements of information:

- Acknowledgement of visual acquisition—The fact that the pilot visually sees (has acquired) the feature previously described by the navigator.

- Terrain descriptor—The name of the visually acquired terrain feature.

A third element of information may also be given by the pilot depending on the situation and the type of terrain, namely:

- Terrain locator information—Information describing where the terrain feature is relative to the aircraft.

Any of the following phrases are acceptable to acknowledge the visual acquisition of a feature:

- *"I SEE THE ..."*
- *"WE'RE OVER THE ..."*
- *"WE JUST PASSED THE..."*
- *"HERE IS THE ..."*
- *"THERE IS THE ..."*

EXAMPLE—*To illustrate a typical acknowledgement of the visual acquisition of a feature, the pilot could state:*

"THERE IS THE — *Acknowledgement of visual acquisition*

DIRT ROAD — *Terrain Descriptor*

TO OUR — *Terrain Locator*

DIRECT FRONT"

2.3 Formulating Statements by the Navigating Crewmember

Although the meanings of individual terms may be clearer as a result of studying this procedural guide, it is a requirement that the terms are combined to form easily understood statements. The statements should be constructed so that the pilot hears the most time-relevant information first, the terrain feature description next, and the least important information last.

Whenever possible, the navigator should provide the following information when giving navigation instructions to an anticipated distant checkpoint:

Terrain Locator Information—The approximate azimuth and distance in meters to the checkpoint, or to where the pilot should expect to see the feature.

Terrain Descriptor Information—The name or type of anticipated feature.

Anticipated Navigation Directions—The control action the pilot can anticipate requiring upon arrival at the checkpoint.

Once the pilot visually acquires a reference/checkpoint, the navigator repeats the desired navigation direction. At a minimum the navigator must provide:

Actual Navigation Direction—The type of navigation control action the pilot must perform at the reference/checkpoint in order to stay on the desired NOE route.

Terrain Descriptor—Identification of the next anticipated checkpoint.

A third element should also be provided whenever deemed desirable:

Terrain locator—Information regarding the distance to or where the anticipated terrain feature is relative to the aircraft.

EXAMPLE—*A simplified example of one typical NOE intra-cockpit communication is given for an anticipated checkpoint. The navigator could state:*

"ABOUT 500 METERS AHEAD, WE SHOULD BE OVER,	—	*Terrain Locator Information*
A SMALL POND	—	*Terrain Descriptor Information*
AND YOU CAN EXPECT TO MAKE A RIGHT TURN"	—	*Anticipated Navigation Direction Information*

To continue the above example, assuming that the pilot acknowledges that he has visually acquired the desired checkpoint (the small pond), the navigator could then state:

"RIGHT TURN AT THE POND, TOWARD	—	*Repeat of the navigation directions*
THE HILL	—	*Terrain descriptor information of the next reference point*
AT YOUR 3 O'CLOCK"	—	*Terrain locator information where the pilot should look to see the hill*

Or the navigator could have stated rally terms (RIGHT TURN, STOP TURN) as navigation directions toward the hill. Navigation directions are discussed in paragraph 3.1

2.4 Avoiding Ambiguity of Frequently Used Terms

A number of commonly used terms have multiple meanings which could contribute to confusion, delays, or even accidents if they are misinterpreted. Several such words are: "right," "tank," "back up," and "I have it." The reader may be aware of others. It is essential that less confusing words be employed when possible, or that the

additional words used provide a context which assures that the speaker's intent is understood.

For example, the word "right" should be reserved to define a direction ("right turn"), rather than to indicate correctness ("that's right") or to specify location ("right here"). The word "tank" alone should be used to define the military armored vehicle, rather than a "water tower" or a "farm pond." The term "back up" must be used with caution to avoid confusing the command to increase altitude with one to move rearward. Finally, the phrase "I have it" must be used with similar caution to avoid confusing which aviator has control of the aircraft with the fact that a crewmember has visually sighted (acquired) a checkpoint during the NOE flight.

3.0 PREFERRED TERMS

3.1 Navigation Directions

NOE Flight is conducted as close to the earth's surface as vegetation or obstacles will permit, while generally following the contours of the earth. Terrain and vegetation are used as cover in order to mask the aircraft from enemy radar or visual detection. In order to accomplish NOE flight safely, the pilot must "keep his/her eyes out of the cockpit" at all times. To maintain the aircraft over the selected route, it is necessary for the navigator to give the pilot heading and airspeed information in such a manner that the pilot is not required to focus attention inside the cockpit (e.g., to read the heading or airspeed indicators). For NOE, the following three methods can be utilized in providing the pilot with heading information:

- Navigation directions toward prominent (recognizable) terrain features
- Rally terms (controlled turns)
- Clock headings

The best choice of method is dependent on such factors as availability of prominent terrain features, frequency of directional changes and visibility. Depending on the situation, the three methods may be combined to provide the most descriptive navigation information. All three methods require that the navigator be map-ground and flight oriented at all times. Each of the methods is described below.

3.1.1 Navigation Directions toward Prominent Terrain Features

This method for providing navigation directions may be utilized when the terrain feature (natural or man-made) is on or near the desired path of flight and can be seen and recognized by the pilot. It also allows the pilot to select the flight path to the terrain feature which provides the best masking cover. In formulating heading statements toward terrain features, the navigator should state the:

- Navigation directional guidance
- Terrain descriptor
- Terrain locator

Directional guidance phrases are comprised of action terms. They should convey, in small increments, what the pilot is expected to do to keep the aircraft on course. The following are the navigation direction guidance terms best suited for NOE flights:

CONTINUE, FLY, HEAD, PROCEED (along, down, following, forward, in, over, until, up, to, toward)

CROSS (between, over, under)

FOLLOW, PARALLEL, TAKE

KEEP, STAY (along, in, over)

STRAIGHT AHEAD (to, toward)

EXAMPLE: *Assuming that the pilot is over a checkpoint and the next reference/checkpoint is in view, the navigator could state:*

"FLY TOWARD	--	*Navigation direction*
THE RIGHT SIDE OF THE HILL	--	*Terrain descriptor*
AT YOUR 3 O'CLOCK	--	*Terrain locator*

3.1.2 Rally Terms

Rally terms are used whenever controlled turns are desired. A rally term means that the pilot turns the aircraft in the desired direction and continues turning until he/she is told to *"STOP TURN."*

The use of rally terms is recommended in situations where prominent terrain features are not present or there is a need to provide frequent directional changes. They may be given with or without a clock heading. When only rally terms are given, there are only three:

- *"LEFT TURN"*
- *"RIGHT TURN"*
- *"STOP TURN"*

Although it is not necessary, a rally term together with a clock heading will let the pilot know the approximate duration of the anticipated turn. However, when the navigator observes that the turn has been achieved, he/she should always announce *"STOP TURN."*

EXAMPLE: *"RIGHT TURN TO YOUR 5 O'CLOCK."* When the desired turn has been achieved, the navigator announces, *"STOP TURN."*

3.1.3 Clock Headings

The clock directions are based on the heading of the aircraft's nose at the time the directional guidance is given (i.e., the aircraft's nose represents the 12 o'clock position). A typical directional change might be, *"TURN TO YOUR 9 O'CLOCK"* which means to turn the aircraft approximately 90 degrees to the left. One problem with clock directions is that the pilot's interpretation of where a certain clock position is may be somewhat different than the navigator's, so that the pilot may not turn far

enough or may turn too far. Consequently, when a clock heading is stated, whenever possible, it should always be associated with a terrain descriptor.

EXAMPLE: *"TURN TO YOUR 3 O'CLOCK TOWARD THE SMALL HILL"*

3.1.4 Combined Methods

When the situation and terrain permit, the preferred heading information should include the combination of all three methods.

EXAMPLE: *"RIGHT TURN, TO THE HILL, AT YOUR 2 O'CLOCK"*

3.1.5 Aircraft Control Advisory Information

Although the helicopter pilot is responsible for the overall control of the aircraft, there are situations when the navigator provides aircraft control information with regard to airspeed and altitude. It is possible, for example, that the navigator cannot remain map-route oriented since the pilot is flying too fast. Conversely, the navigator can advise the pilot that a faster airspeed is possible since there is little or no problem in maintaining a desired NOE route orientation. The pilot should not, however, be told to fly a specific airspeed because this requires him/her to look inside the aircraft.

Airspeed changes are announced as:

"INCREASE SPEED," "DECREASE SPEED" or "STOP" followed by the reasons why.

It may become necessary for the navigator to relate altitude information, e.g., to clear an obstacle/hazard or achieve better masking, and so on. Altitude changes are stated as:

"CLIMB" or "DESCEND" and when the desired altitude has been achieved, announce "MAINTAIN"

In the situation where the navigator has become disoriented or lost, he/she should announce *"HOLD HERE" or "STOP,"* followed by the reason why.

Finally, at any time a crewmember observes an immediate hazard or obstacle which may not be observed by the pilot, that crewmember should announce the immediate required control action, the type of hazard and the approximate distance from the aircraft.

EXAMPLE: *"CLIMB! WIRES, 50 METERS!"*

3.2 Terrain Locators

To aid inflight navigation, the navigator uses the map to select recognizable terrain or man-made features

at some distance ahead of the aircraft, and located on or near the NOE route. In describing the distant feature, the navigator must provide enough information so that the pilot can visually acquire it when it comes into view. Terrain locator information, regarding distance to the feature and where it can be visually located relative to the aircraft, will aid the pilot in acquiring it. Typical terrain locator phrases are provided under the two following categories:

- Distance to the feature—The distance to the feature from the aircraft or from a ground reference point can be estimated by using map information and should be expressed in hundreds of meters. Examples of typical terrain locator phrases regarding distance are:
  - *"APPROXIMATELY 500 METERS AHEAD..."*
  - *"ABOUT 300 METERS AHEAD OF US..."*
  - *"IN ABOUT 400 METERS..."*

An example using a ground reference might be:

"ABOUT 500 METERS BEYOND THE HILL, YOU WILL SEE A FORK IN THE STREAM."

- Orientation to the feature—To visually orient the pilot toward a distant feature, the navigator tells the pilot where to look. The "clock" position or position relative to the aircraft are the two frequently used techniques to orient the pilot. The following are commonly used phrases:
  - *"TO YOUR 3 O'CLOCK"..."*
  - *"AT THE 9 O'CLOCK..."*
  - *"TO OUR 12 O'CLOCK..."*
  - *"TO OUR DIRECT FRONT..."*
  - *"DIRECTLY IN FRONT OF US..."*
  - *"ON THE RIGHT (LEFT) SIDE..."*
  - *"OUT OUR RIGHT (LEFT) DOOR..."*
  - *"OUT THE LEFT SIDE AT 10 O'CLOCK"*

3.3 Terrain Descriptor Modifiers

Terrain descriptors often can be made more specific by the addition of information regarding the shape, color, texture and size of objects or features. For example, a *"HILL"* can be described more specifically by referring to a *"SMALL HILL"* or a *"SPARSELY VEGETATED HILL"* or the *"SNOW-COVERED HILL."* The additional words to describe the hill are referred to as modifiers. Some common modifiers for use with terrain descriptors are provided under the four following headings:

- Shape—The form of an object as defined by its contour or outline. Shape modifiers include: narrow, wide, rectangular, round, irregular, flat, and so on.

- Color—The quality of an object with respect to the light it reflects, identified by the color name, intensity and brightness. Describing terrain features by color helps to single out the feature of interest from the surrounding features. For example, the navigator could direct the pilot to *"HEAD TOWARD THE BLACK WATER TOWER RATHER THAN THE WHITE ONE,"* thus differentiating between two otherwise similar objects. Besides color names (e.g., green, brown, red, etc.), one can also use terms like pale, dark, dull, bright, and so on.

- Texture—The characteristic physical quality given to an object by the size, shape, density, arrangement and proportions of its elementary parts. Texture modifiers include: smooth, rough, rugged, frozen, dry, wet, snow-covered, shiny, sandy, rocky, sparse, heavy and so on.

- Size—The spatial dimensions, proportions, or extent of an object or feature. Size modifiers include: large, small, long, short, high, low, tall, shallow, deep, wide, narrow, major, minor, and so on.

Other modifiers are possible for use with terrain locators (such as: near, far, bottom, top, corner, side, and so on) and with navigation directions (such as: gentle, gradual, sharp, and so on). The use of modifiers is generally recommended. However, modifiers that are not clear or are easily confused should be avoided. Excessively wordy modifiers can create confusion, affect reaction time, or divert attention from other mission responsibilities.

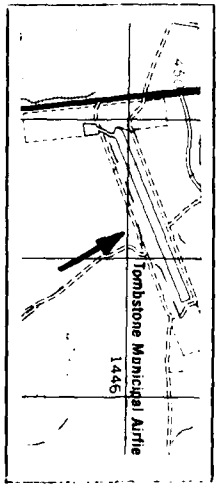
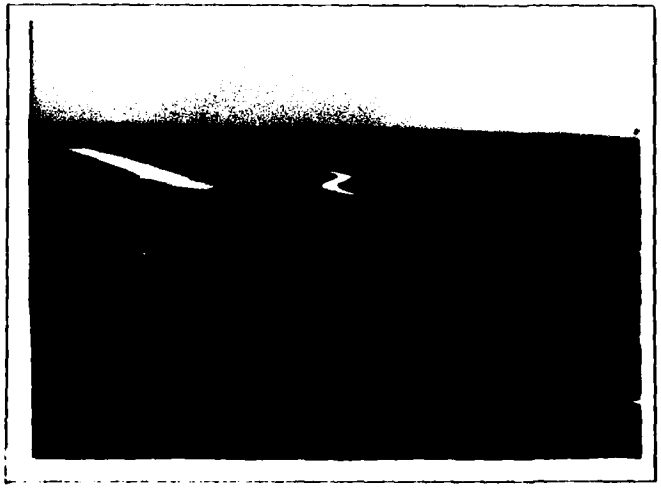
3.4 Special Terms for Special Situations

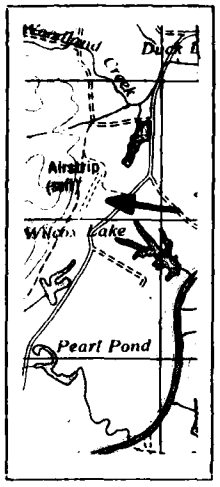
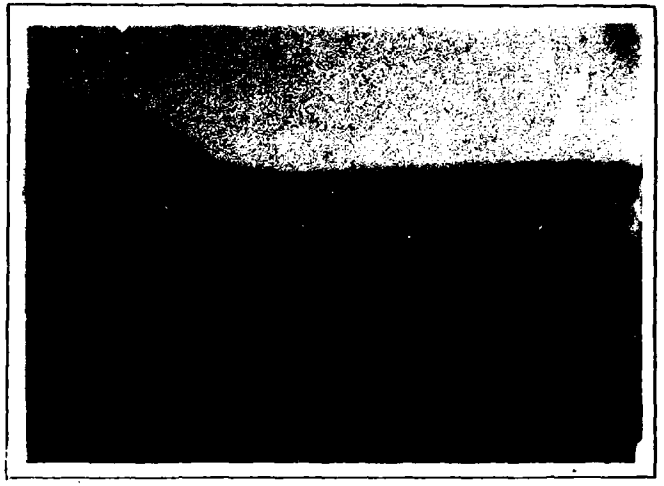
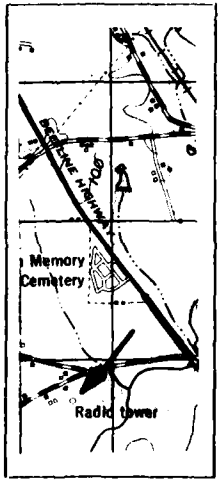
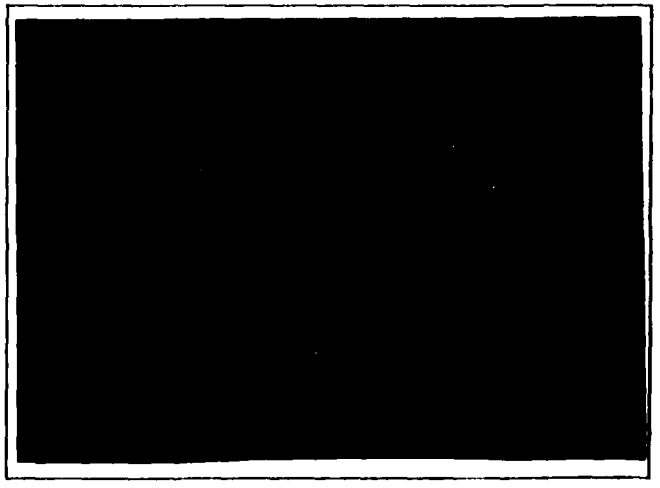
It is inevitable that unique terrain descriptor terms, not listed in Section 3.5, will be necessary in certain situations, or will be popular because of widespread use in particular geographical regions. Among such words are those for man-made objects found mainly in specific places, such as: chicken house, amphitheater, oil well and launching tower. Other words refer to natural features which occur in few locations, such as: fjord, oasis, geyser, butte, and pack ice. In addition, there are colloquialisms or slang words that are commonly used in relatively limited regions of a country, such as : crik (creek) and yonder (there).

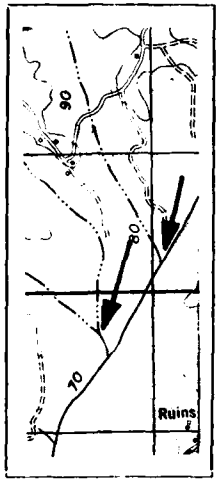
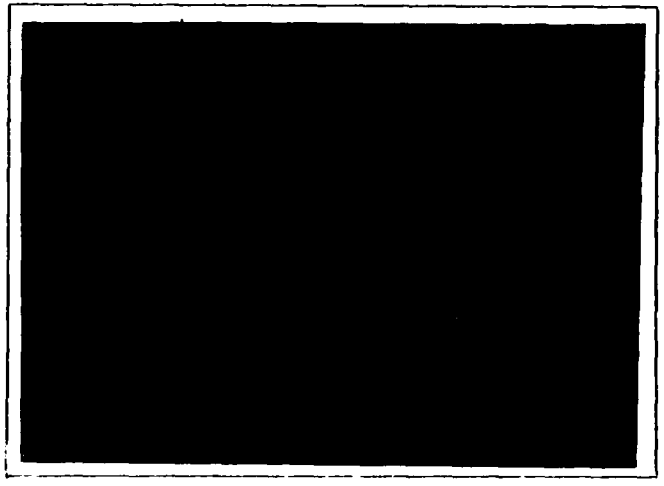
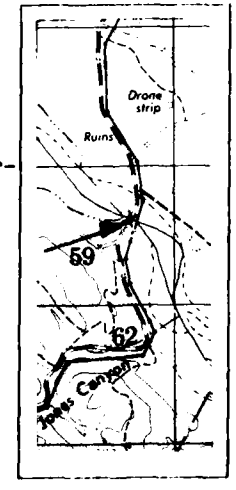
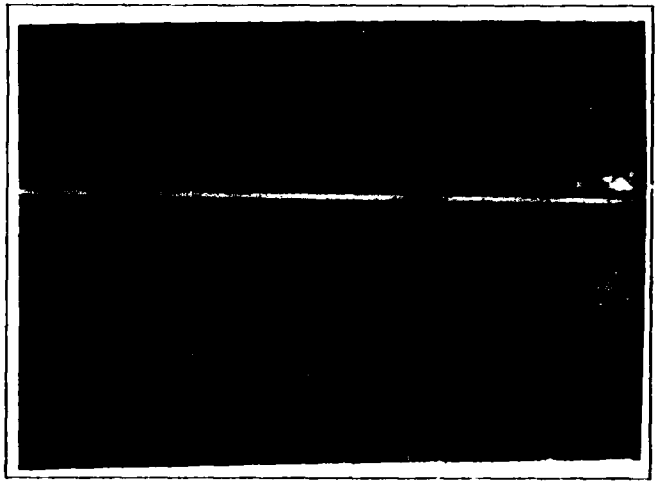
If a special term is to be used, it is essential that each crew member is sure of the other's understanding of that term. Newly formed crews are especially vulnerable to misunderstandings or confusion when "regionalisms" or special terms are employed.

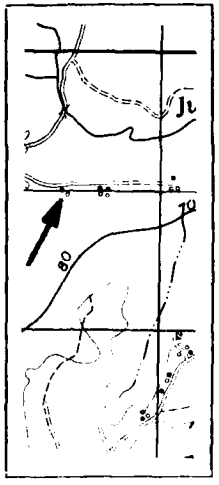
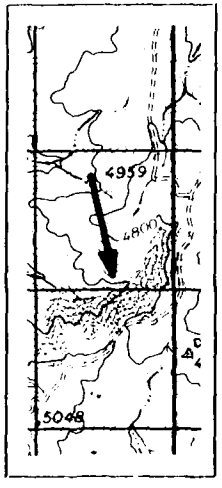
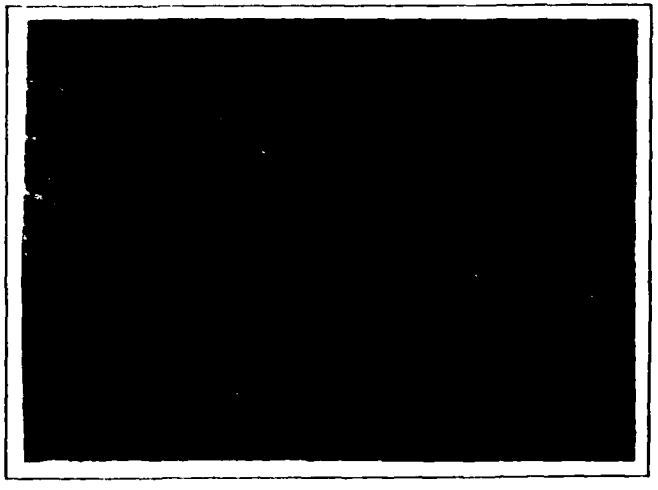
3.5 Terrain Descriptors

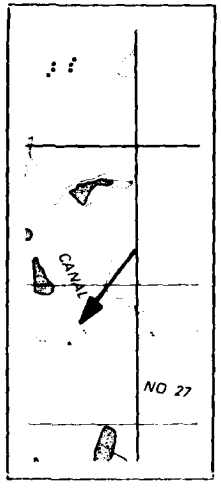
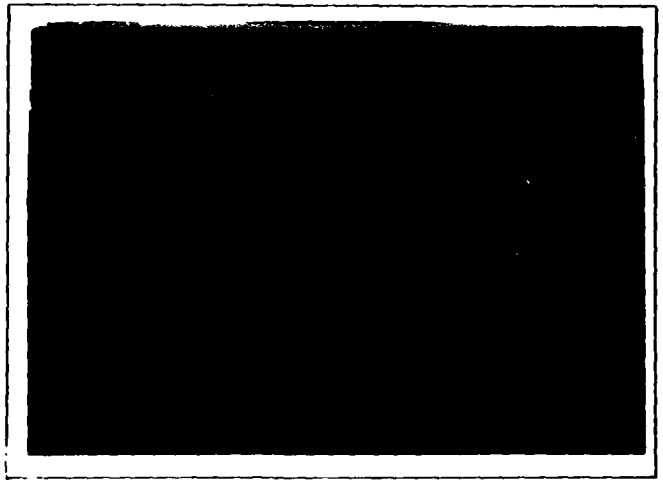
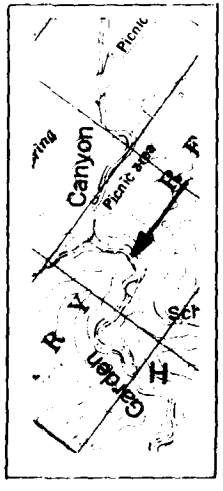
The following terms are preferred for describing terrain features as seen on a map or in the crewmember's visual field outside the aircraft during NOE flight. The preferred terms are listed alphabetically. As stated previously, the terms are defined from the viewpoint of how a crewmember might observe the feature from a helicopter at NOE altitudes, rather than from a conventional dictionary definition. To aid in remembering and correlating the term definition with actual features, full-color maps and photographs are provided where appropriate.

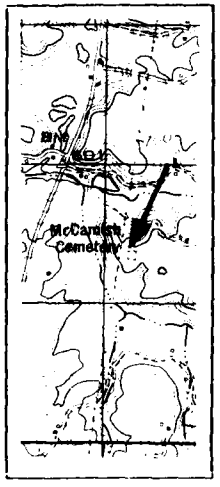
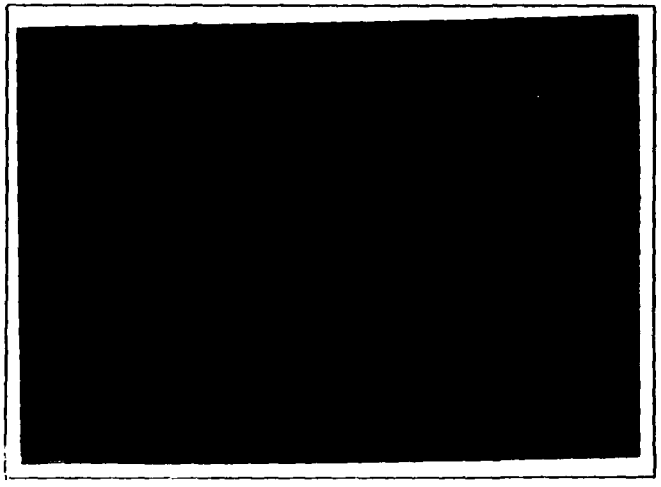
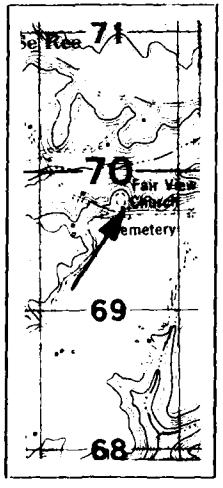
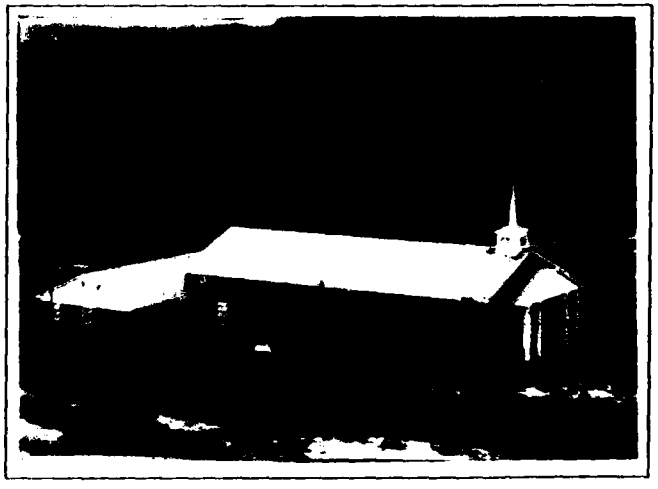
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
AIRFIELD	A level area usually equipped with hard-surfaced runways for aircraft take-off and landing.		

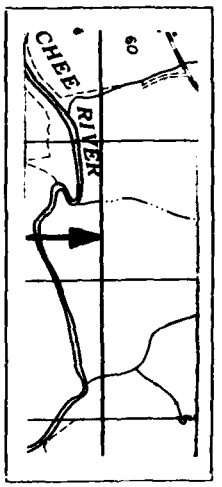
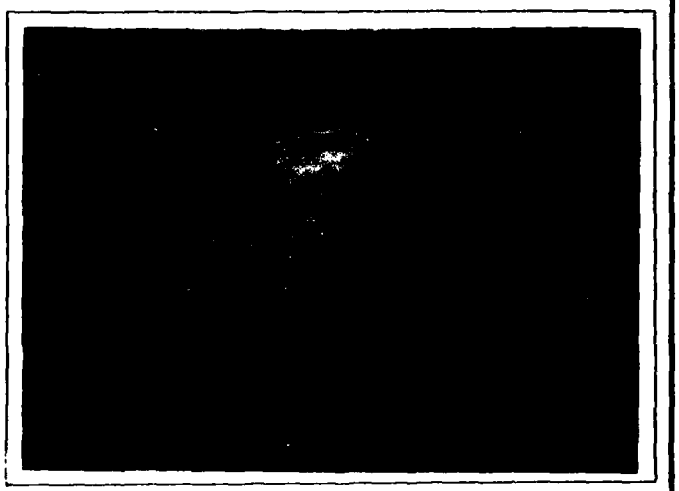
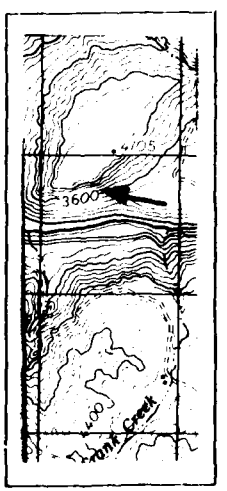
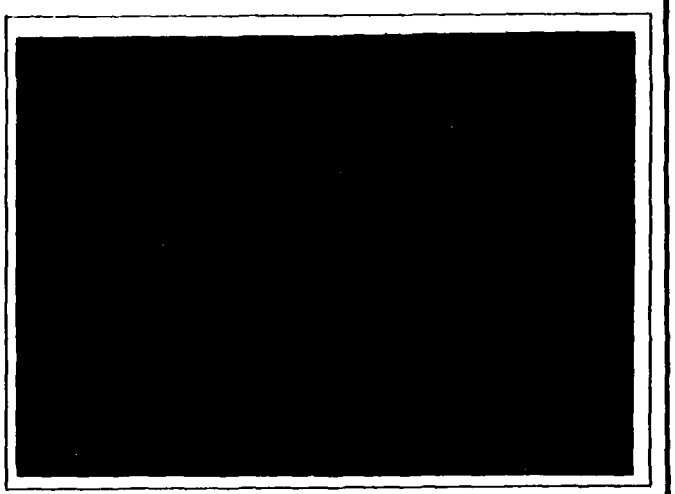
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
AIRSTRIP	A cleared strip of land on which aircraft can take-off and land.		
ANTENNA	A tall, thin vertical metal structure with or without guy wires.		

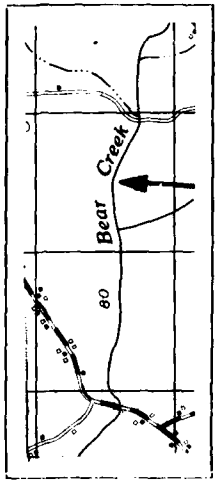
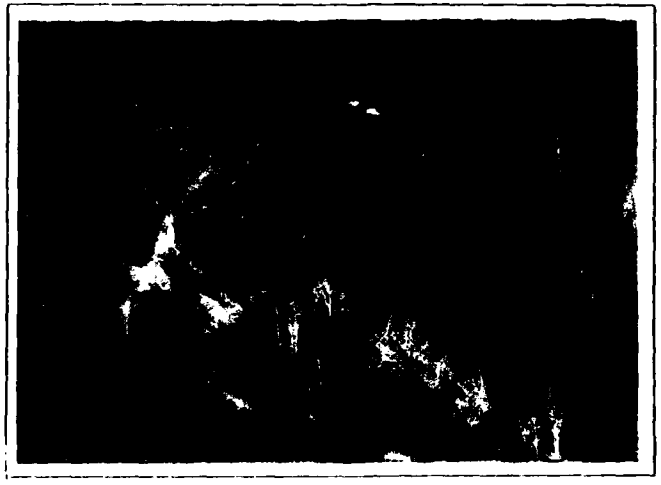
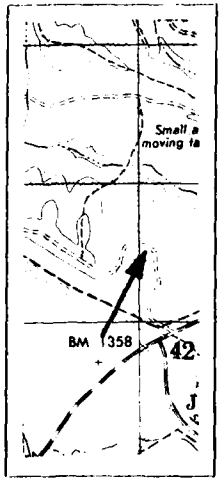
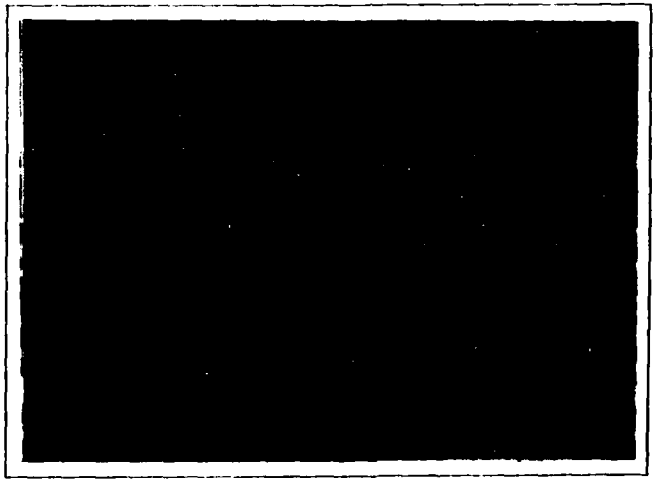
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
BRANCH	A small tributary joining a creek or stream.		
BRIDGE	A structure over a depression, body of water or other obstacle that provides a continuous pathway for such traffic as automobiles, trains and pedestrians. Included in this definition are overpasses and underpasses.		

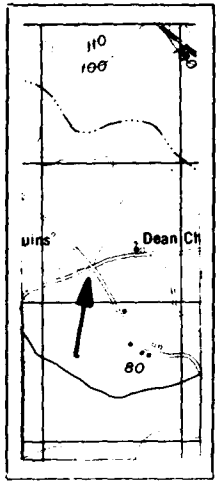
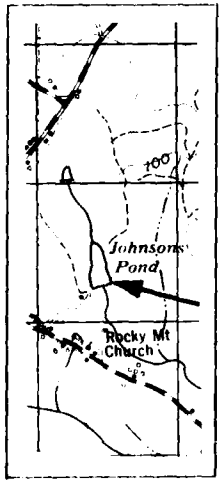
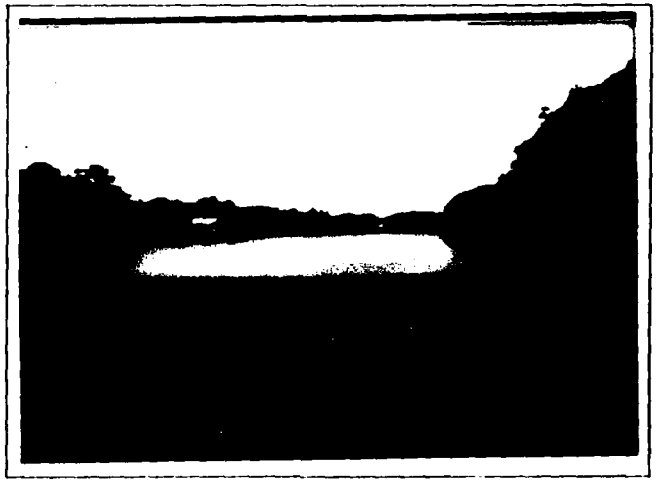
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
BUILDING	A relatively permanent boxlike structure which is usually covered by a roof and enclosed by walls; serving as a dwelling, store house, factory, shelter for animals, or other purpose.		
BUSH	A low plant, less than 10 feet tall, with woody stems branching near the base.		

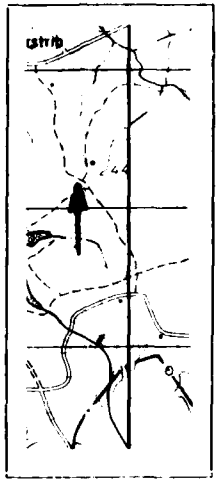
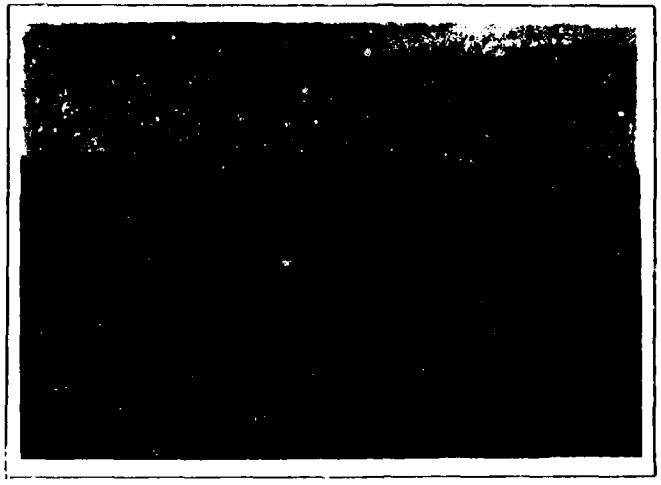
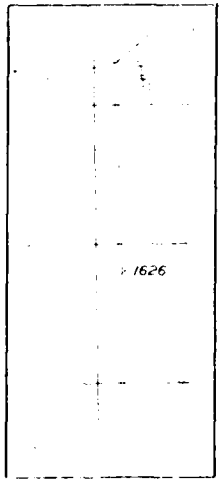
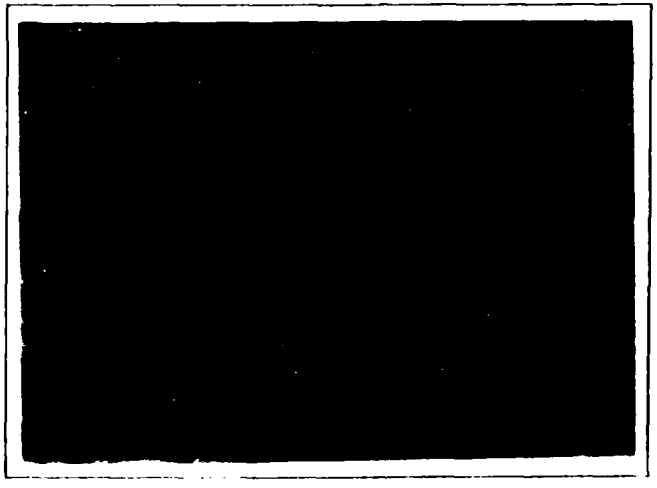
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
CANAL	A man-made waterway designed for boat navigation or for draining or irrigating land.		
CANYON *(See Ravine)*	A deep relatively narrow valley with steep sides. Often with a stream flowing through it.		

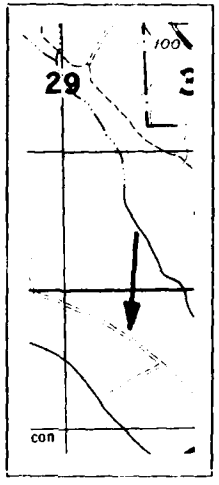
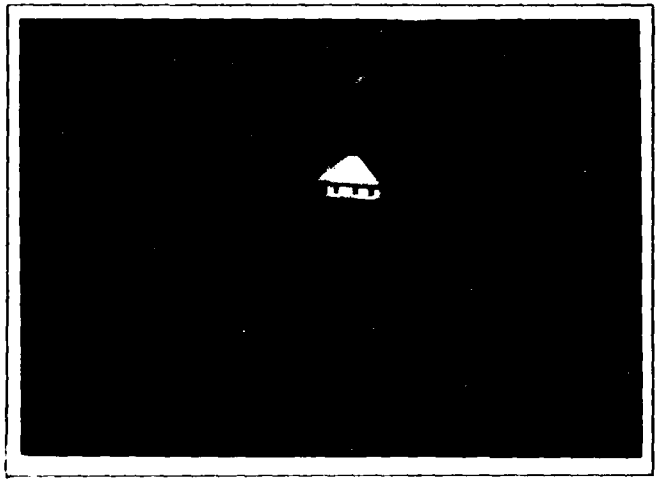
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
CEMETERY	A land area with uniform patterns of grave markers (monuments). Often adjacent to a church.		
CHURCH	A building that may or may not have a steeple with a cross, which serves as a house of worship. May have an adjacent cemetery.		

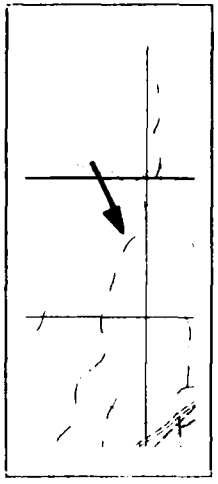
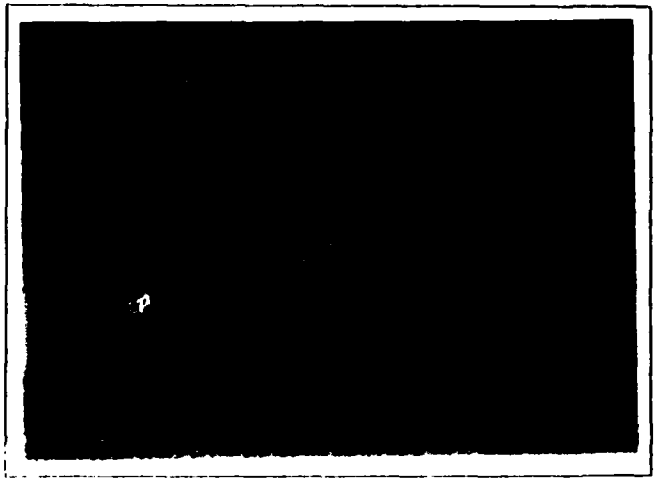
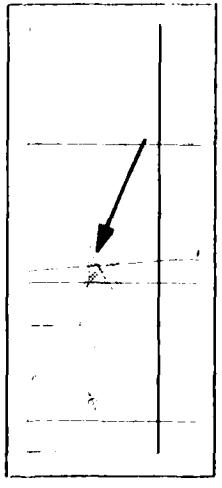
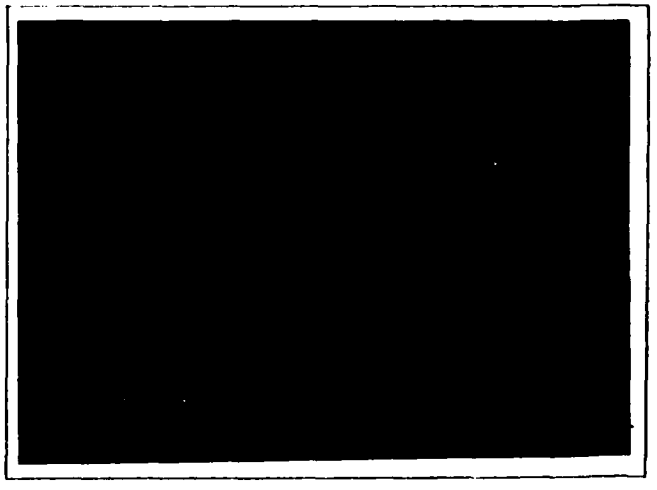
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
CLEARING	A tract of land within a wooded area that contains no trees or bushes.		
CLIFF	A very steep, perpendicular, or overhanging face of rock, earth or glacial ice of considerable height.		

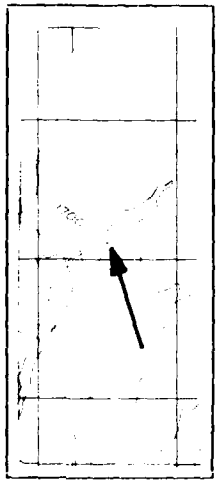
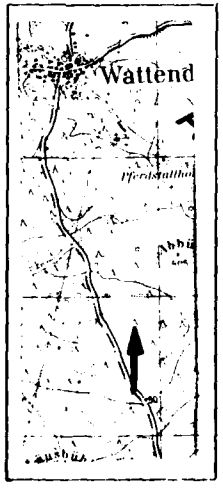
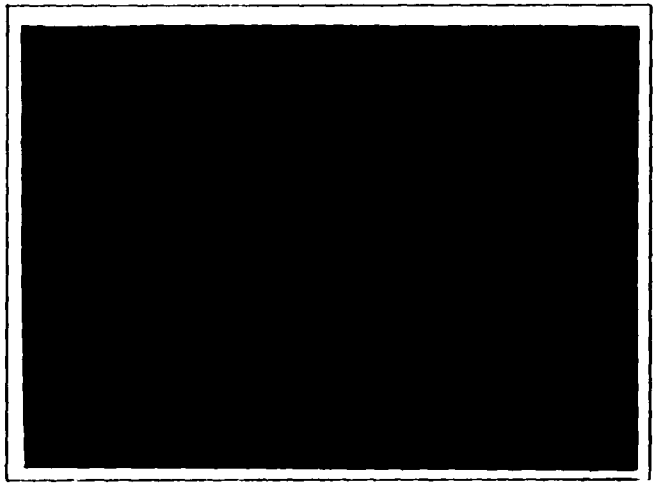
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
CREEK (See Stream)	A body of flowing water with a volume less than a river. A creek is normally not as wide or as deep as a river. A regional term used to describe a stream.		
CREST (OF THE RIDGE)	The highest point or surface along a ridge, all points of the ridge crest are higher than the ground on both sides of the ridge.		

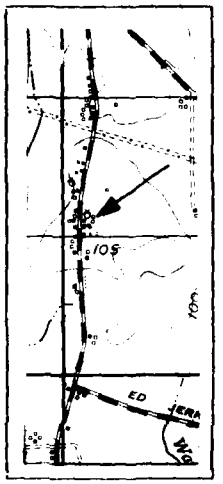
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
CROSSROAD	A place where one road intersects and crosses another road; also know as an "X" intersection.		
DAM	A barrier to contain or hold back a flow of water. Usually located at a reservoir or pond on a farm or ranch.		

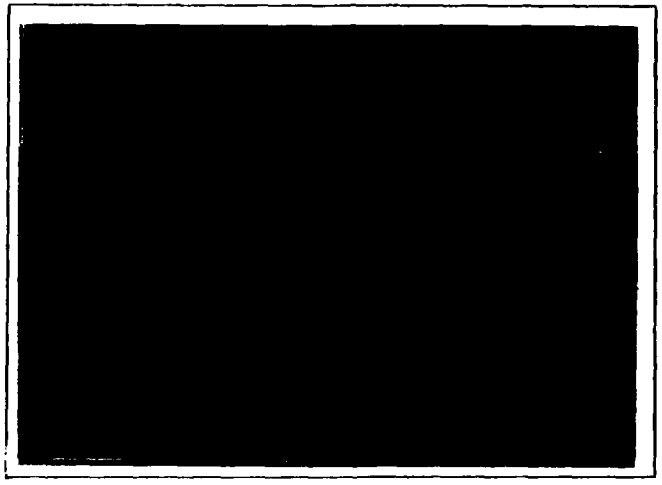
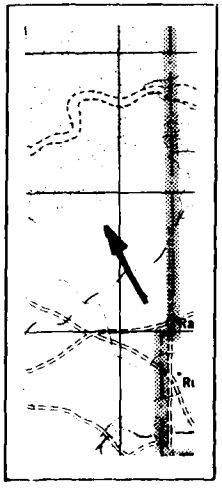
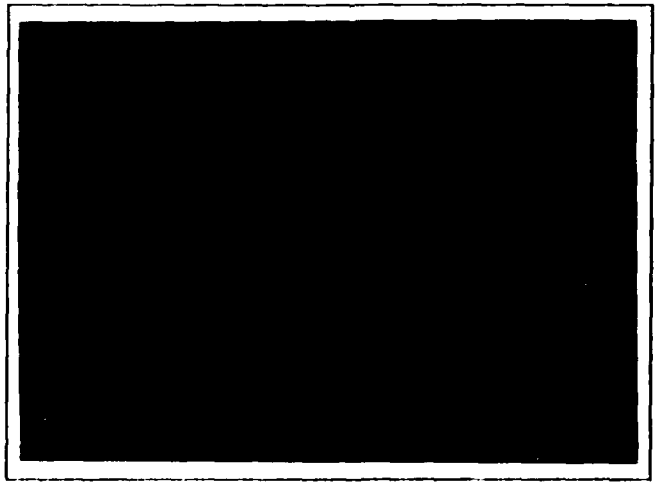
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
DEPRESSION	A low point of any size surrounded on all sides by higher ground. Usually a depression has no natural outlet for surface water.		
DESERT	An arid land area often sandy with little or no vegetation.		

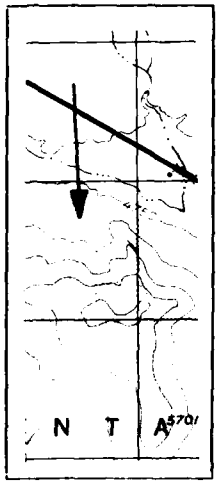
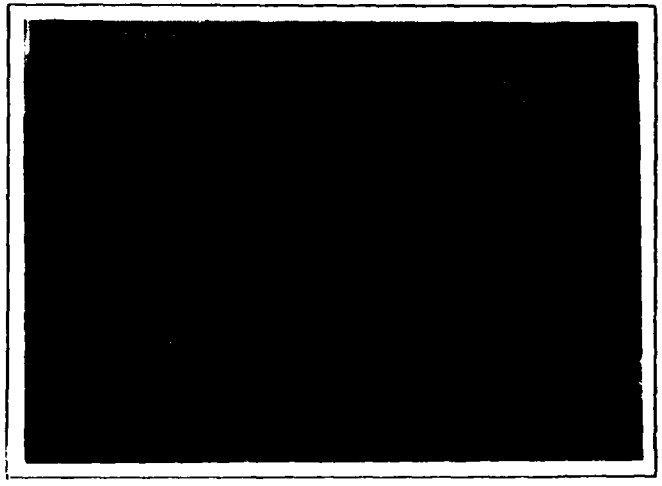
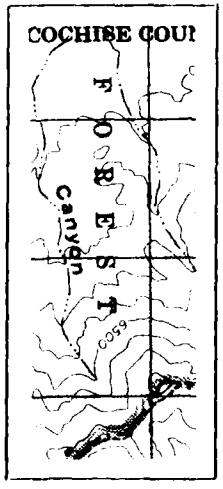
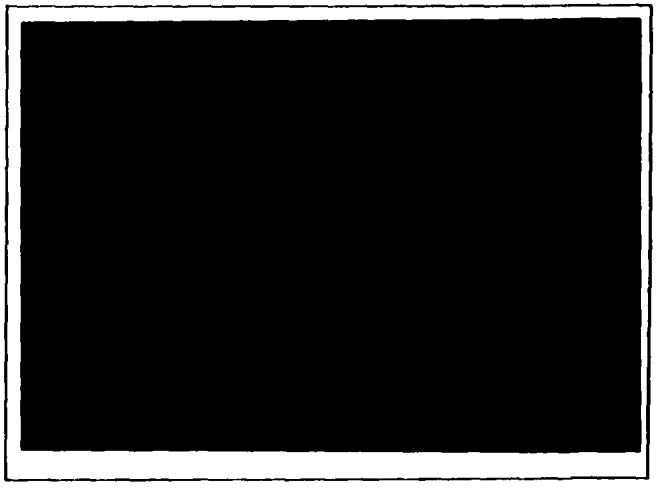
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
DIRT ROAD	A soil or gravel surfaced road which is fairly trafficable in most types of weather.		
DRAW	A natural drainage way for an intermittent stream, generally shallower than a ravine. The ground slopes upward on each side and toward the top of the draw. Draws frequently occur along the sides of ridges, at right angles to the valleys between them. Contour lines on the map indicating a draw are V-shaped with the point of the V toward the top of the draw.		

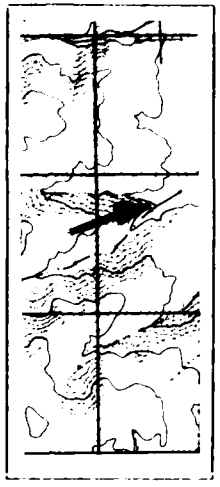
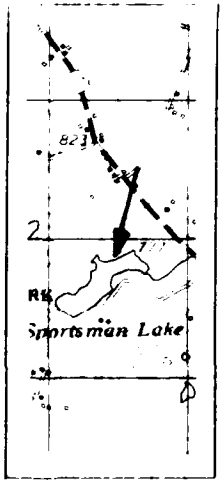
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
DRY CREEK (See Intermittent Stream)	A creek that has little or no water flowing in it.		
DRY LAKE (See Lake)	A lake that has little or no water in it.		

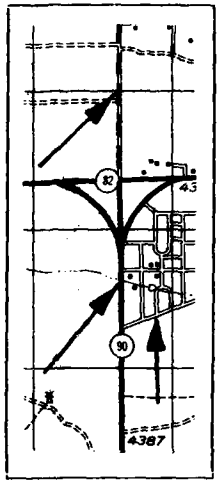
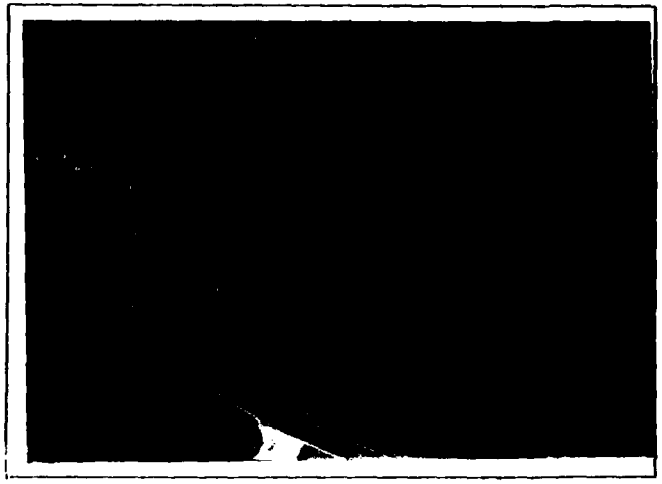
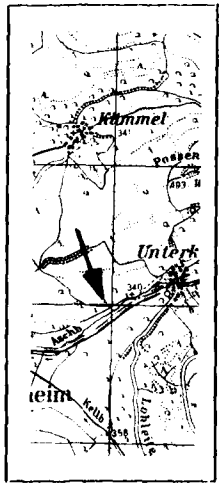
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
DRY POND	A pond which has little or no water in it.		
EVERGREEN (Coniferous)	A tree having foliage (needles) throughout the year. Includes pine, spruce, and other coniferous trees.		

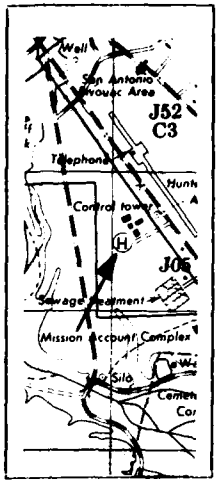
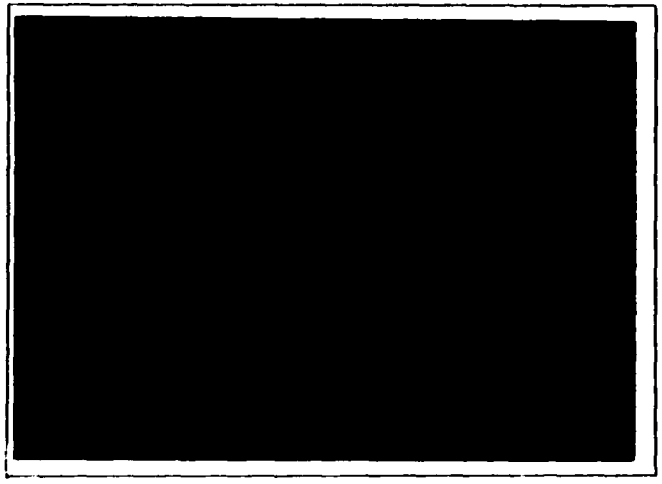
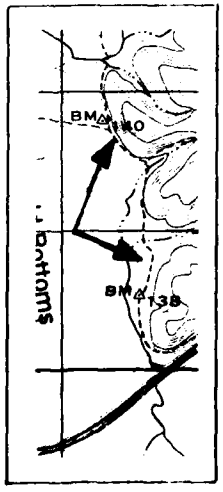
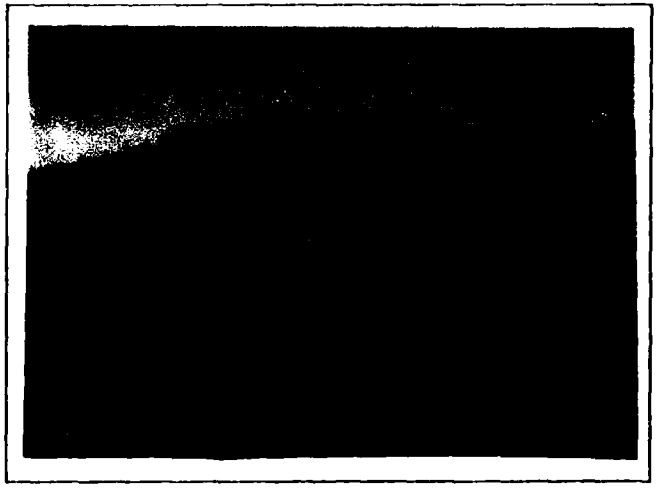
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
FARM (See Ranch)	A cleared tract of land, usually with a house, barn, etc., on which crops and/or livestock are raised.		
FENCE	A barrier enclosing or bordering a field, usually made of posts and wire, used to confine animals or prevent passage.	Not Available	

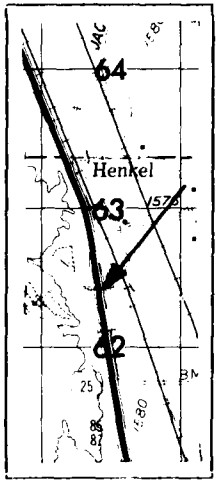
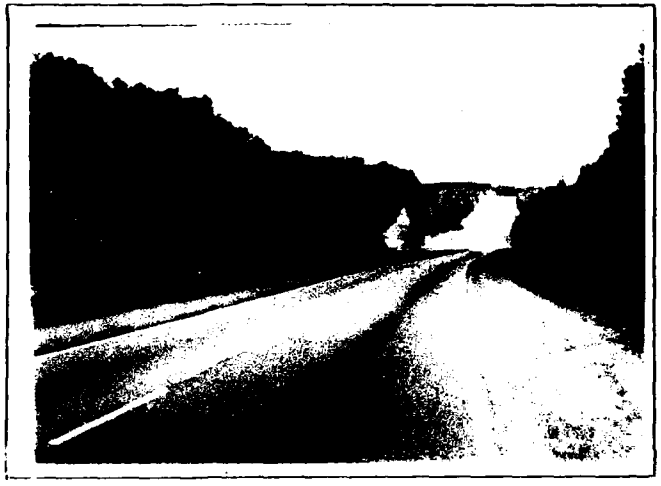
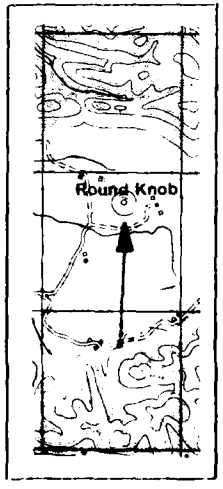
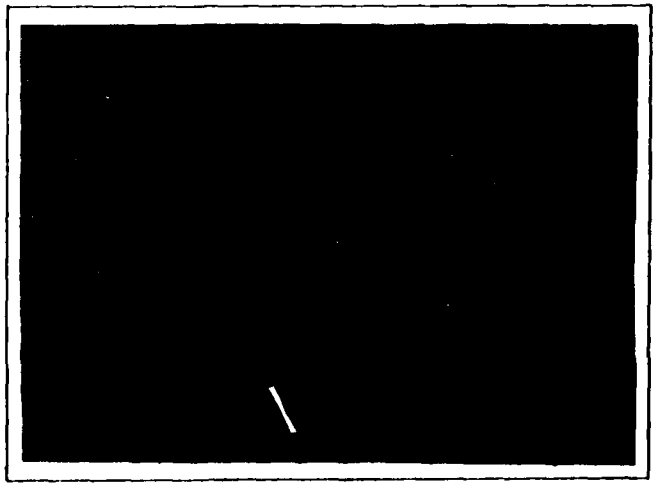
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
FIELD	An open land area, cleared of trees and brush, used for cultivation or pasture.		
FLAT TERRAIN	A land surface area without any hills or mountains, with relatively minor differences in elevation.		

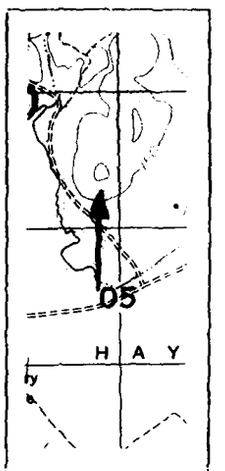
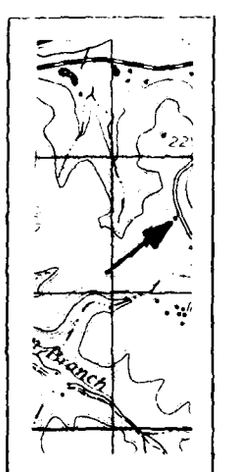
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
FOOTHILL	The land area at the base of, or foot of, a hill or mountain.		
FOREST (See Wooded Area)	A large tract of land covered with trees and underbrush; extensive wooded area.		

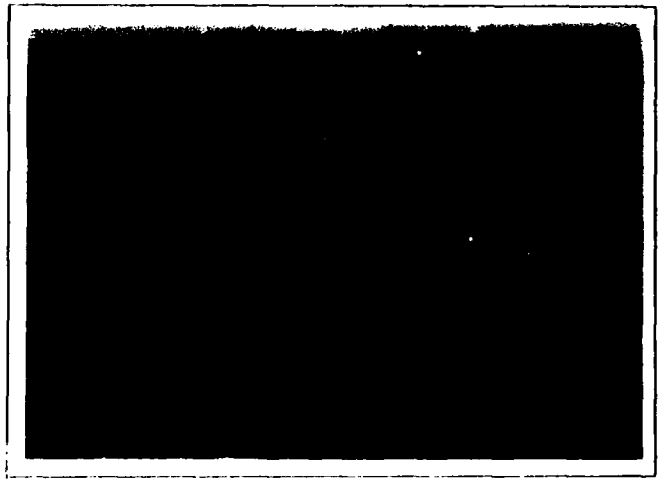
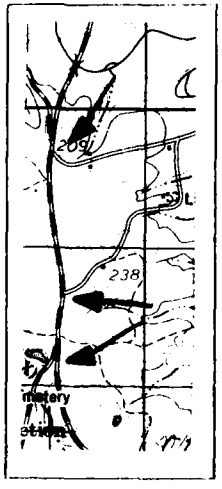
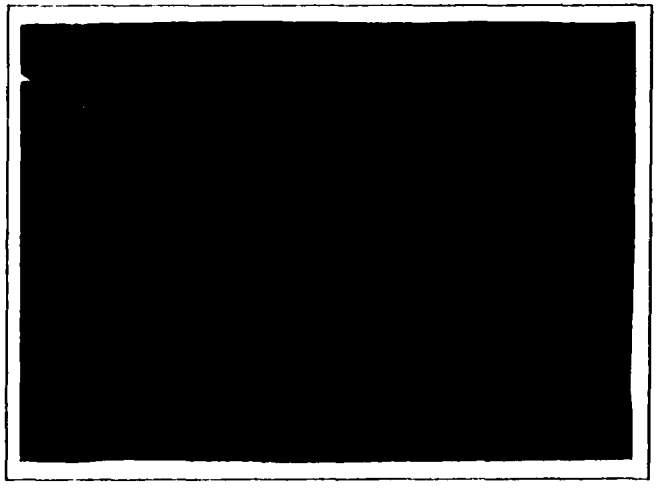
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
FORK	The point at which a specific terrain feature e.g., a stream, a draw, a road, a valley, etc., divides into a "Y" to form two such features.		[redacted]
FROZEN LAKE (See Lake)	Ice covered lake.		[redacted]

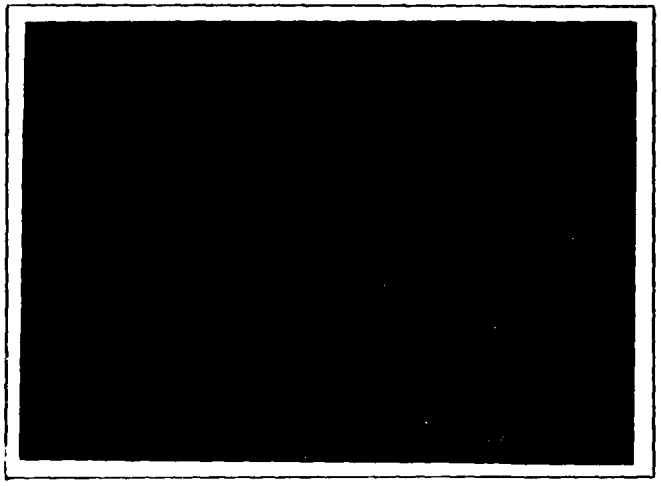
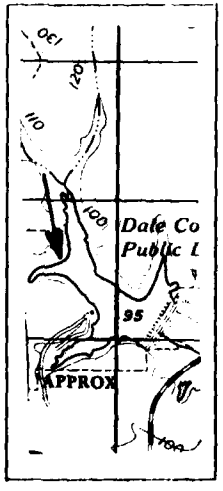
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
HARD SURFACE ROAD	This type of road is paved. The surface construction is usually asphalt material or concrete.		
HARDWOOD (Deciduous)	A deciduous, leaf-bearing tree. Hardwoods are generally broad leaved and lose their leaves seasonally either in cold or dry seasons.		

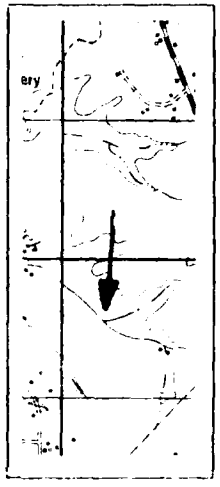
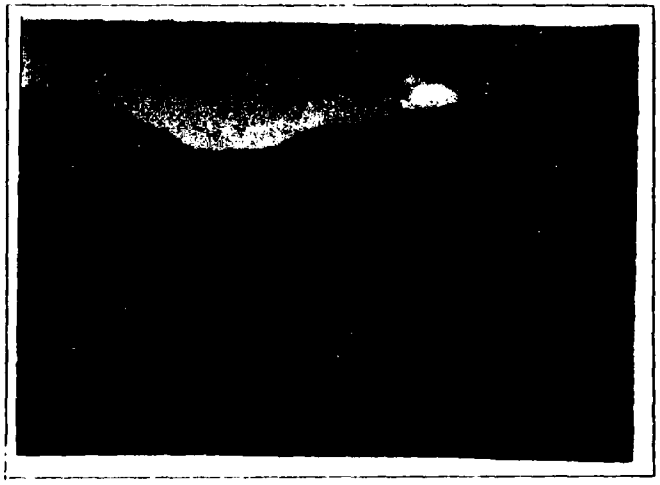
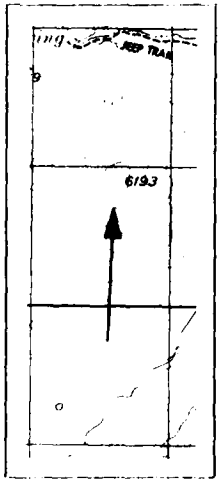
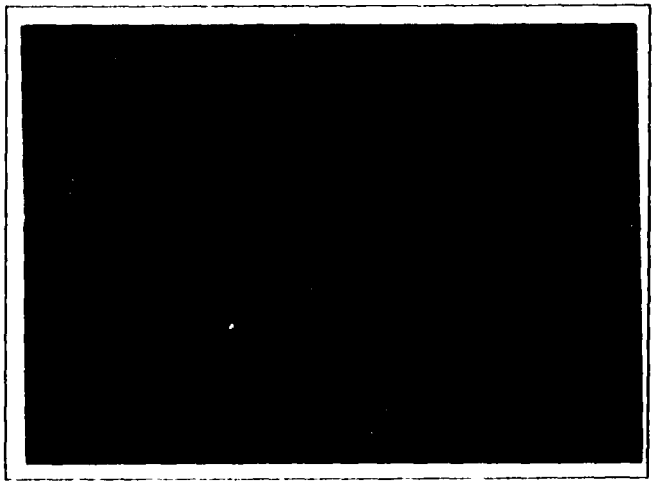
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
HELIPAD (See Airfield, Airstrip)	A prepared area designated and used for the take-off and landing of helicopters.		
HIGH GROUND (See Terrain)	Land area which is perceived to be higher in elevation than its surrounding area.		

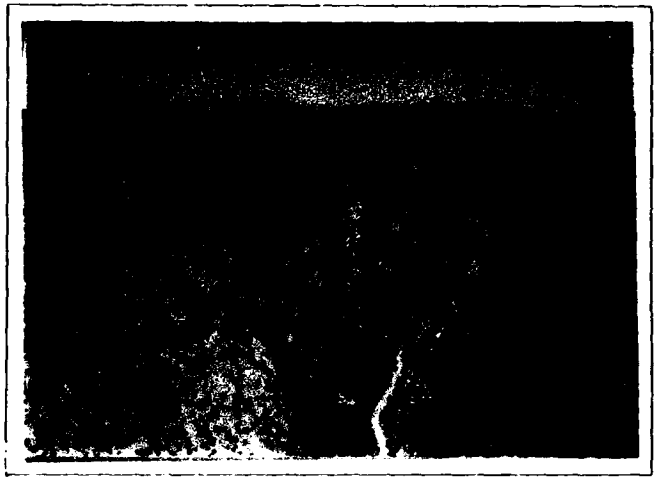
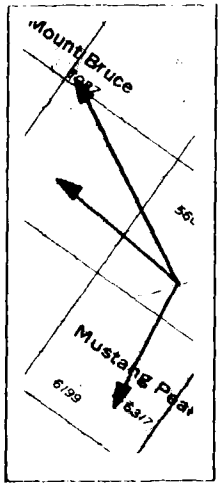
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
HIGHWAY	A multi-lane hard surface road connecting cities/ towns.		
HILL	A prominent land form characterized by moderately high local relief.		

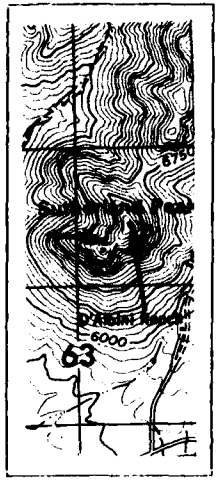
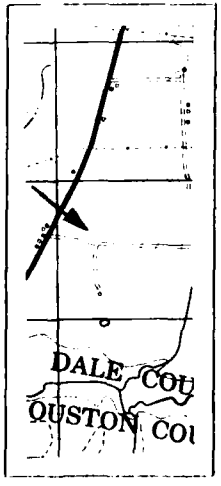
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
HILLTOP	The top, crest or summit of a hill.		
HOUSE *(See Building)*	A building in which people live. This feature is differentiated from a house trailer in which people live, but is not permanently fixed in its location.		

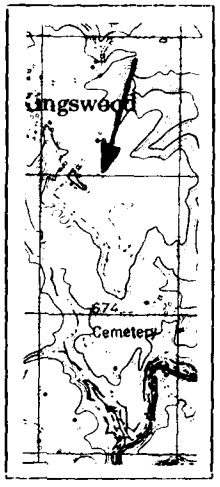
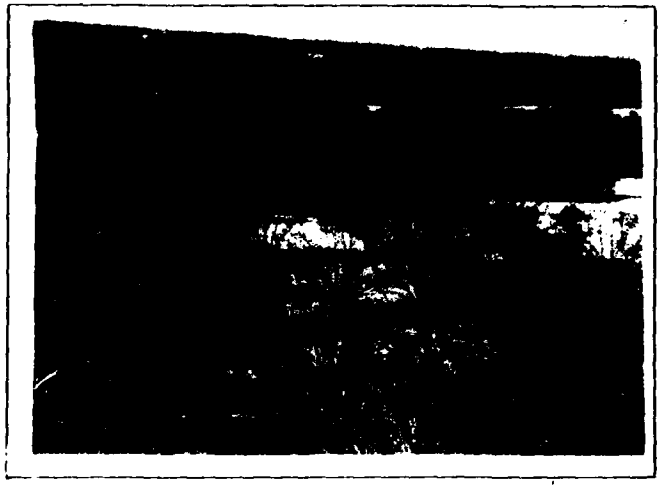
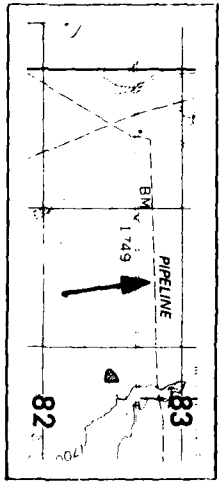
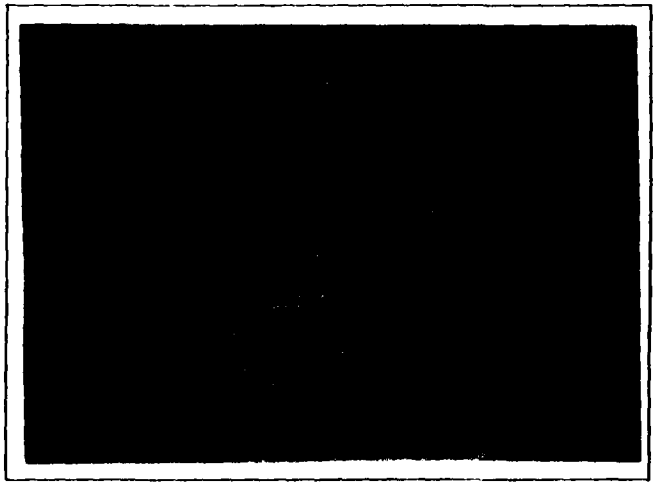
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
INTERMITTENT STREAM	A stream that may or may not have water flowing in it, depending on the season and rainfall.		
INTERSECTION	A place where two or more roads/railroads meet to form a "T" or "Y" intersection.		

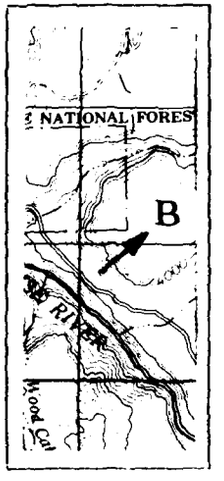
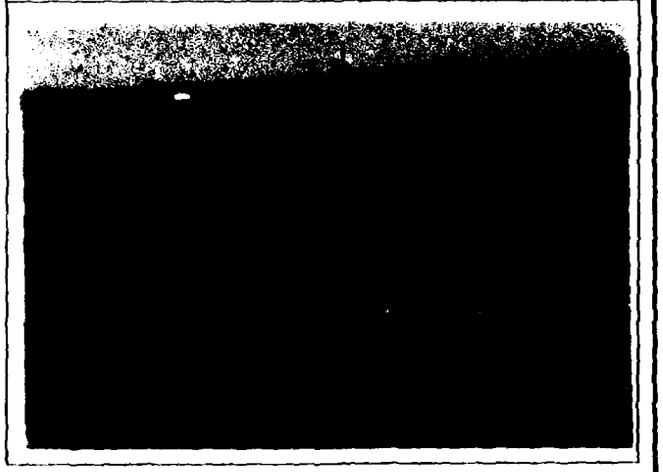
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
ISLAND	A relatively small tract of land surrounded by water.		
LAKE	A body of fresh or salt water of considerable size completely surrounded by land. Artificial lakes or reservoirs are formed by retaining water by a dam across a valley.		

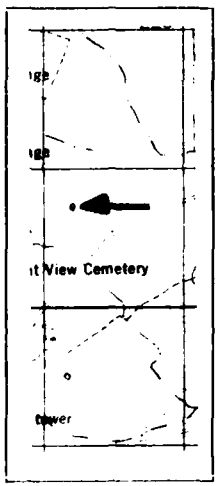
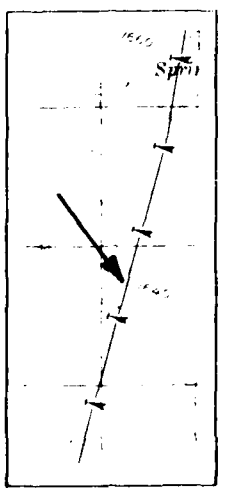
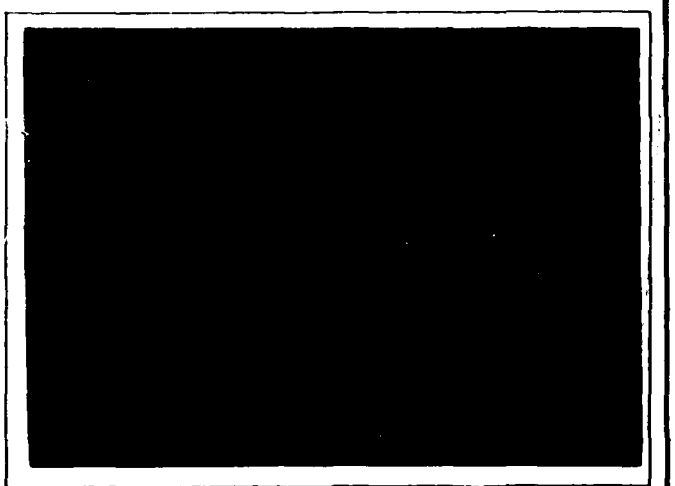
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
LOW GROUND	The lowest surface area which is perceived to be of lower elevation than its immediate surroundings. A term frequently used to describe terrain which is between higher surrounding terrain, e.g., a valley, draw, stream, etc.		
MOUNTAIN (See Hill)	Mountains are characterized by high elevations, steep slopes, and steep summit areas. The land mass rises conspicuously above the surrounding area.		

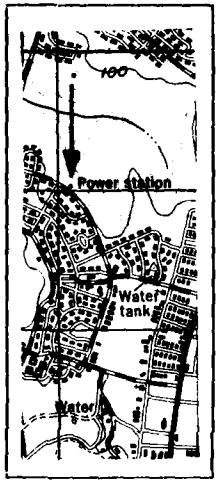
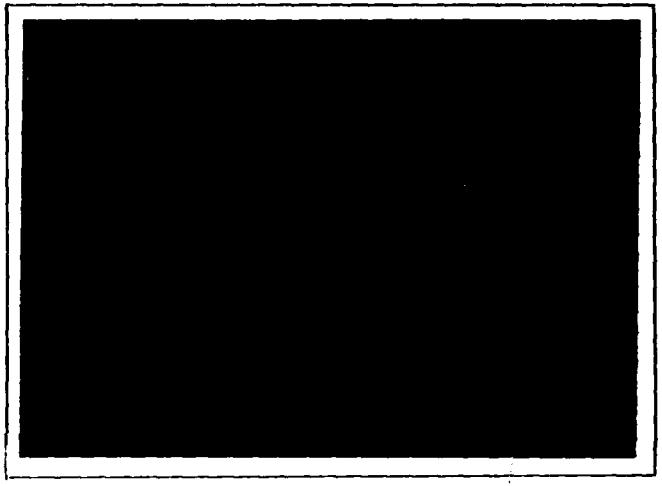
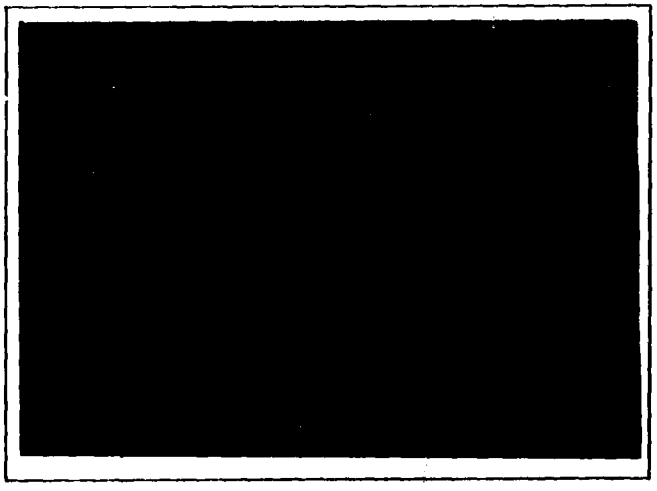
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
MOUNTAINOUS AREA	An area characterized by a series of mountains or a description of mountains as being large and high.		
MOUNTAIN RANGE	A series of more or less connected mountains arranged in a line.		

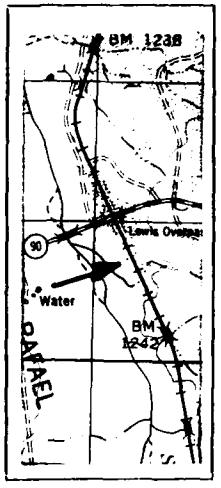
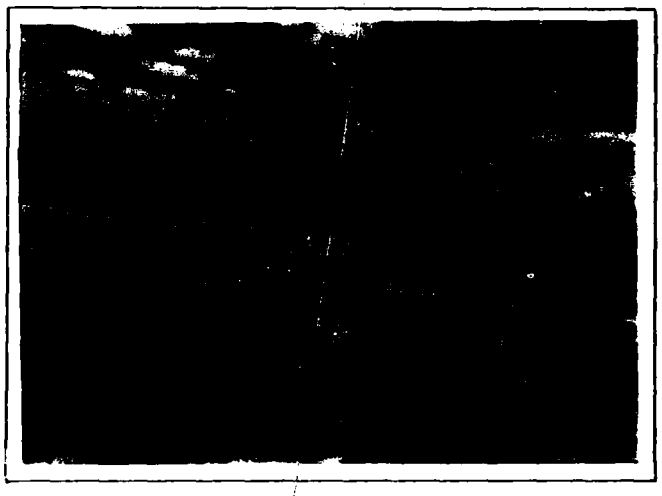
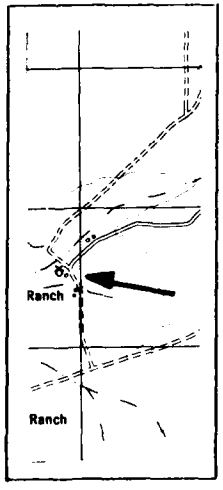
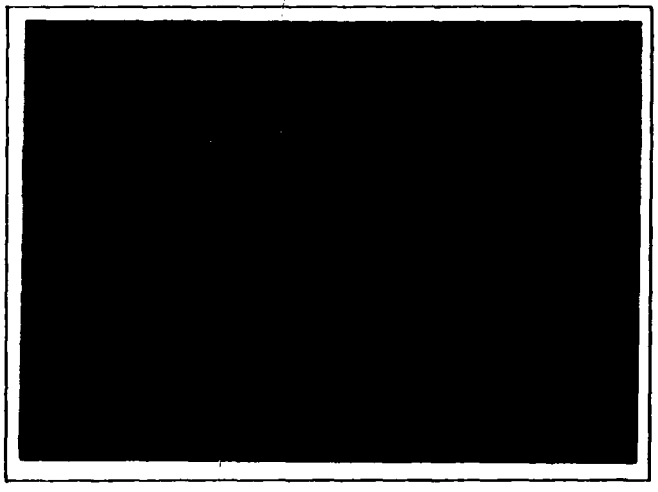
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
MOUNTAIN TOP	Top, crest or summit of a mountain.		
OPEN AREA (See Field)	Land area without trees, buildings or obstructions, which does not seem to be used for agricultural or livestock purposes.		

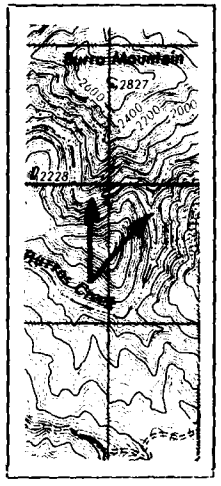
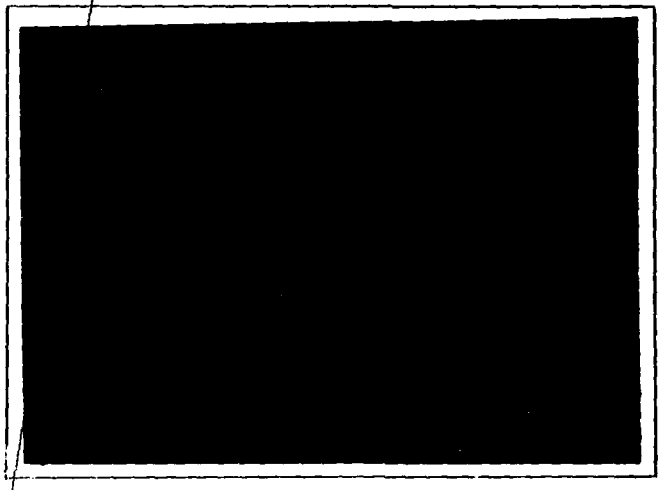
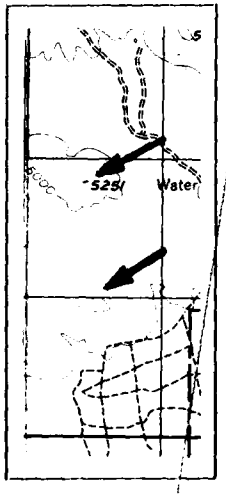
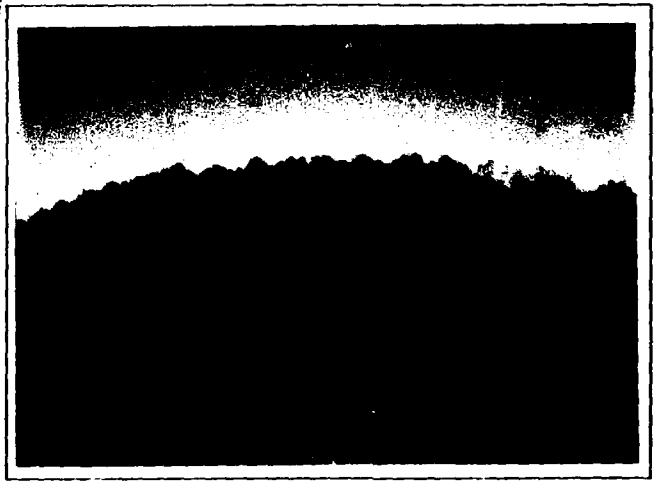
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
ORCHARD	A grove of trees, fruit, nut or sugar maple, aligned in rows.		
PIPELINE	A line of pipe which may be above or below ground. Included in this definition are aquaducts. Indicators of underground pipelines include a long linear cleared right of way, ground scars and levee-like mounds.		

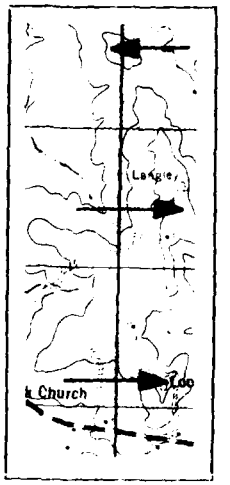
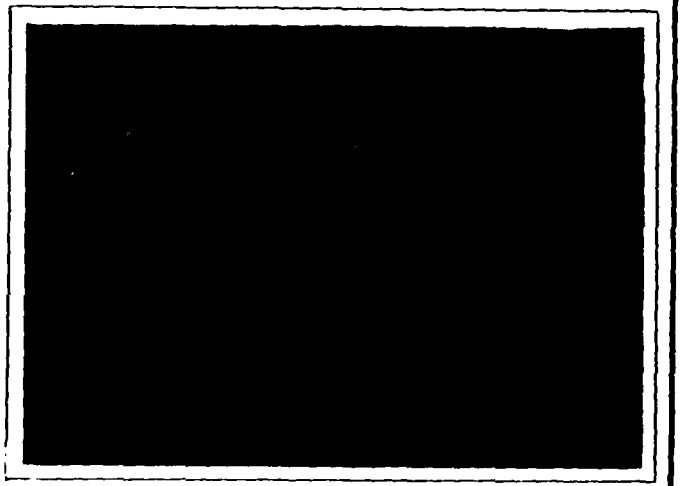
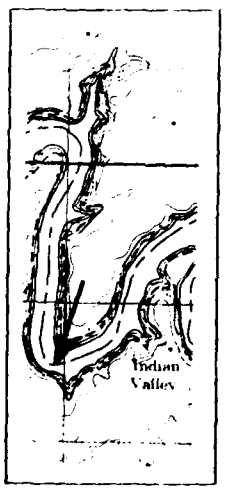
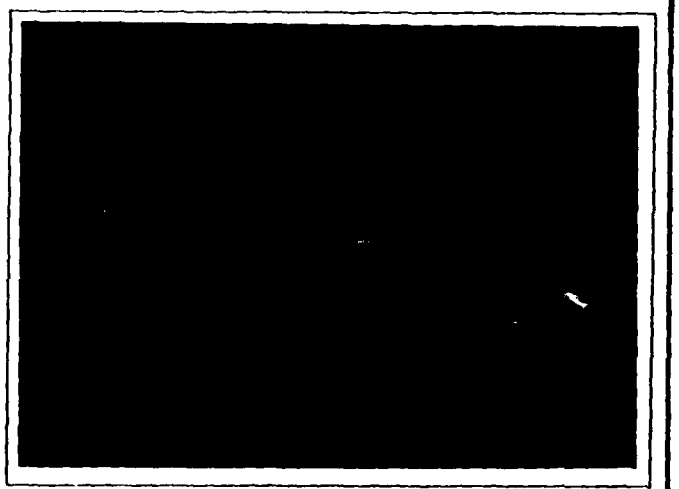
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
PLATEAU	A land area having relatively level surface, considerably raised above adjoining land on at least one side, and often cut by deep canyons.		
POLE	A tall, solid, usually cylindrical length of wood or other material that is vertically erected and uniformly spaced with other similar units to support electrical lines and/or telephone lines.	Not Available	

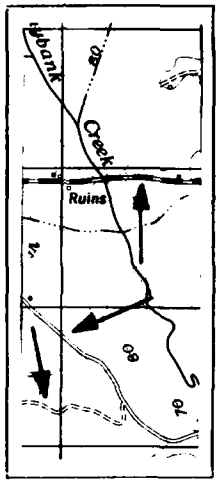
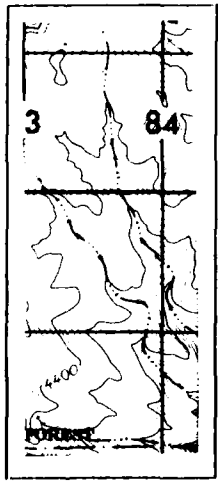
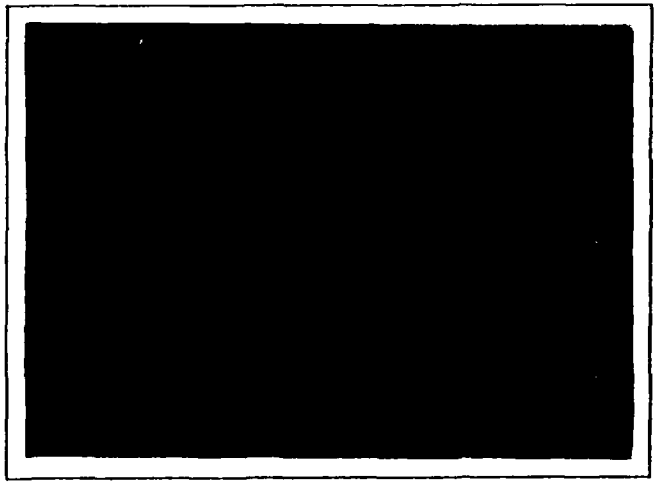
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
POND	A body of water smaller than a lake and larger than a pool, either naturally or artificially confined (includes ponds constructed for irrigation purposes or to supply water for farm animals).		
POWER LINE (See Wire)	A linear arrangement of several high voltage electrical lines strung between support structures, usually metal or wooden towers, that transport power from one location to the next. The area under powerlines is cleared of trees and can be readily identified in forested or wooded areas.		

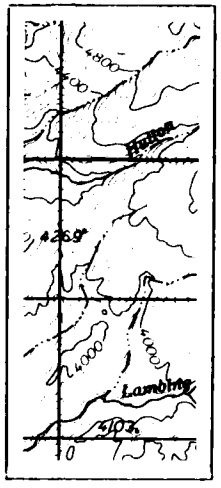
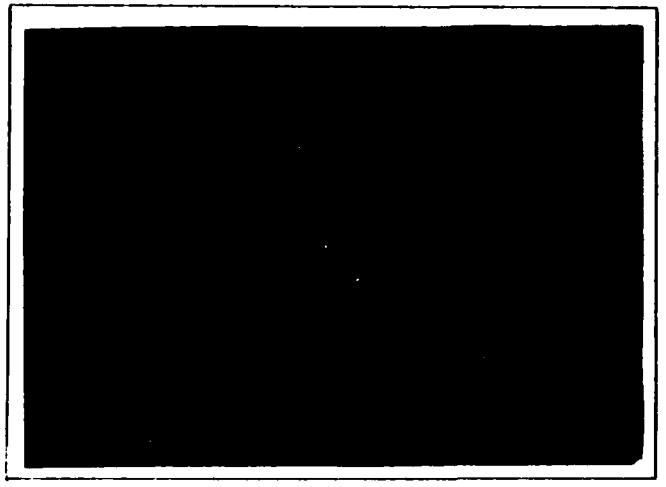
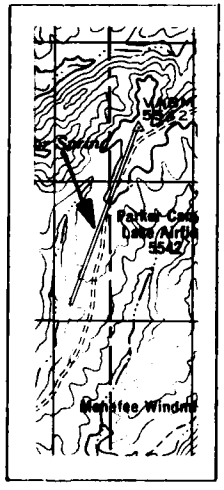
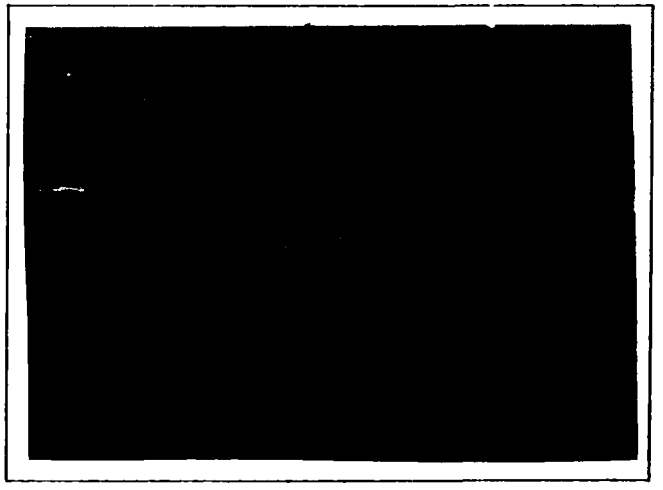
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
POWER STATION	An electric utility generating station, usually with an arrangement of power lines which originate at the station and are strung over land between support structures.		
QUARRY	Man-made hollowed out area. (for mining purposes).		

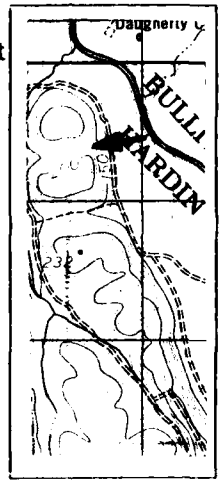
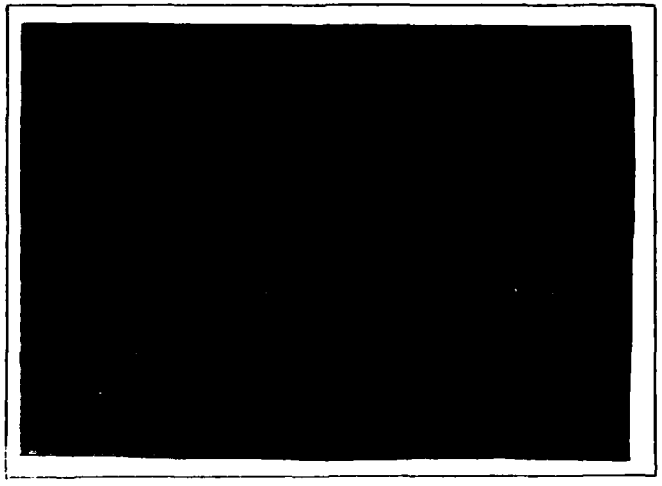
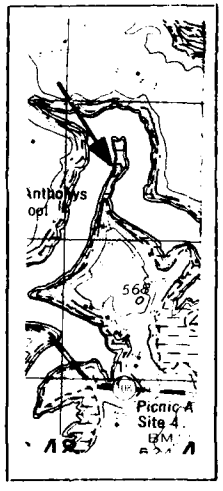
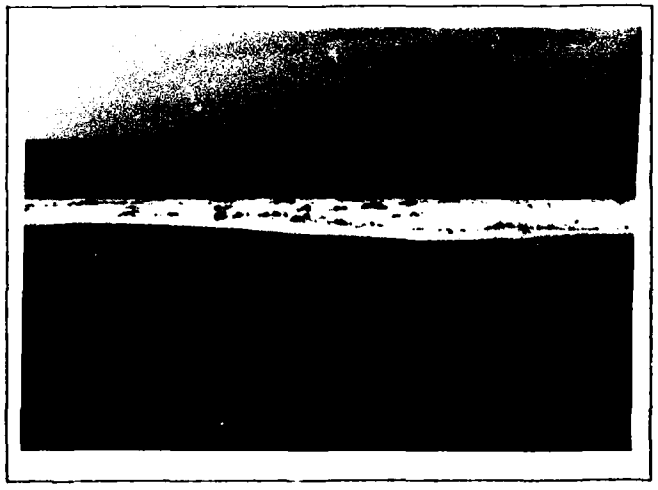
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
RAILROAD	A permanent road having a line of rails fixed together with ties to provide tracks that support railroad locomotives, passenger and freight cars.		
RANCH	A tract of land primarily used for raising livestock under range conditions.		

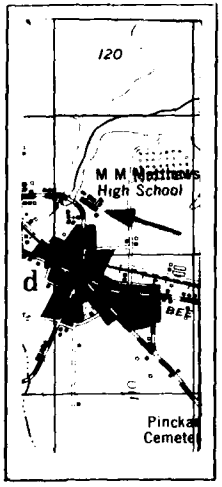
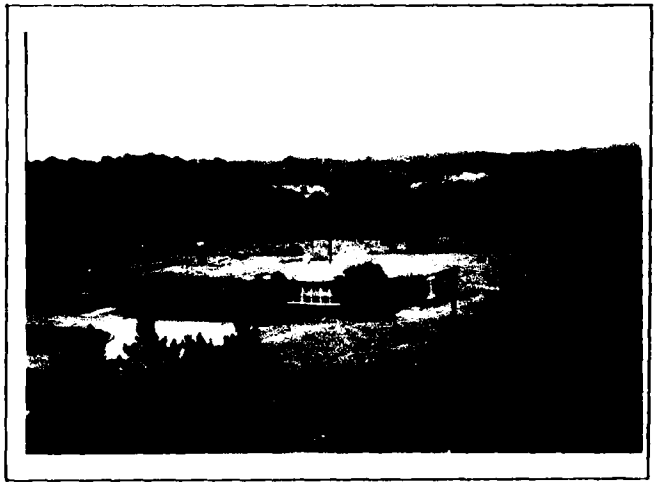
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
RAVINE (See Canyon)	A narrow steep-sided valley that is smaller than a canyon. Probably formed through erosion by running water.		
RIDGE	The upper elevation of a range of hills or mountains.		

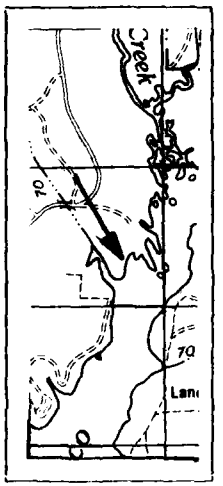
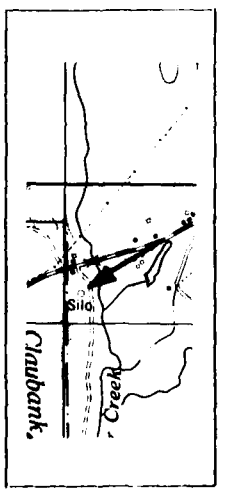
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
RIDGE LINE	A line of high ground with normally minor variations along its crest. A long range of hills or mountains.		
RIVER	A natural water course of considerable volume and permanent flow. A river is larger (wider and deeper) than a stream.		

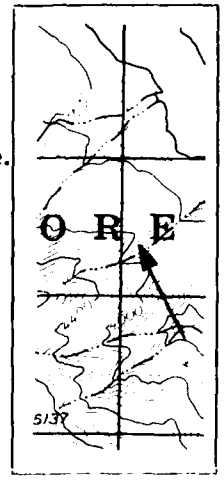
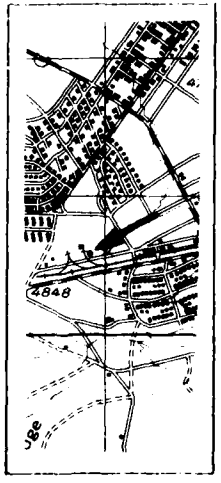
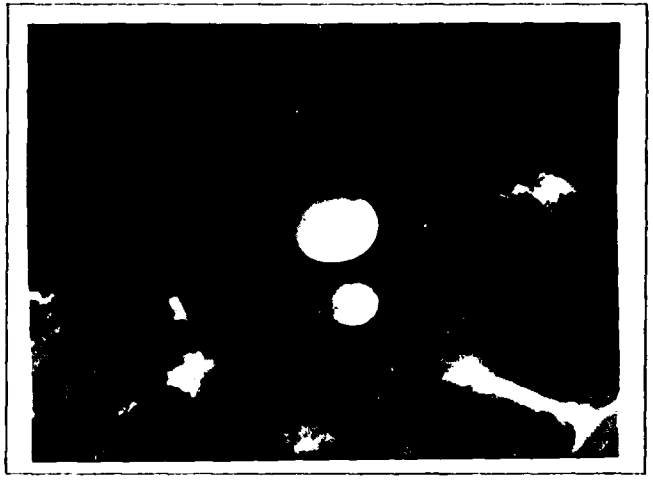
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
ROAD *(See Dirt Road, Hardsurface Road)*	A paved or unpaved way made for travelling between places by vehicular traffic.		
ROCKY TERRAIN	A mass of stone (boulders) lying at or near the surface of the earth. Outcroppings or exposed bedrock, stone joining a hill, cliff or mountains.		

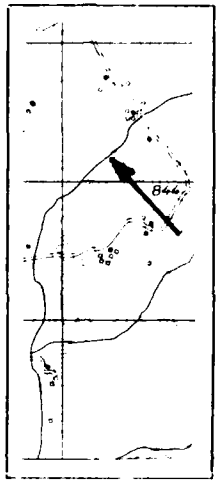
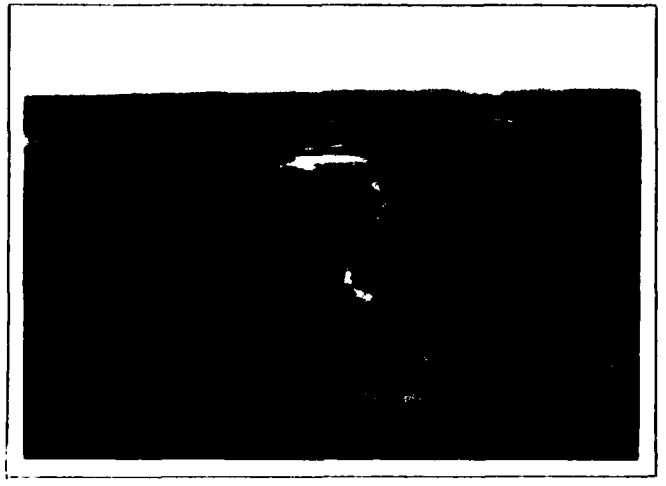
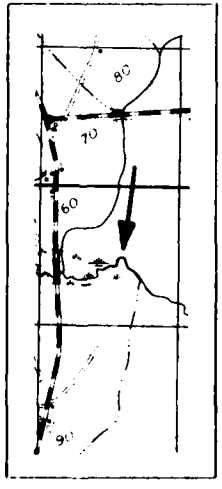
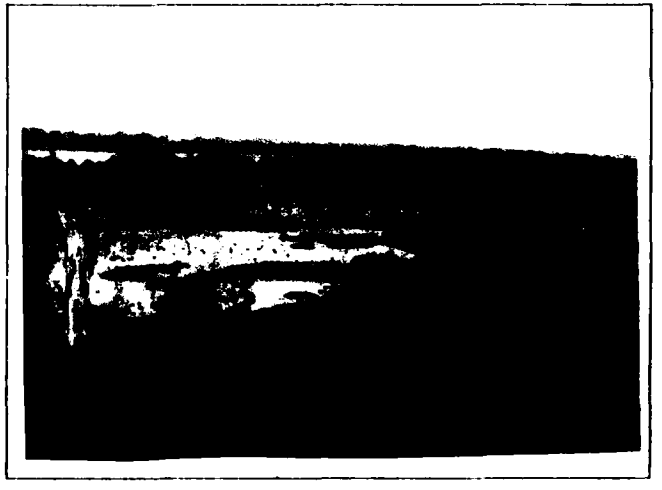
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
RUGGED TERRAIN	Ground having a roughly broken, rocky, hilly or jagged surface.		
RUNWAY	A paved or cleared strip on which aircraft can take-off and land.		

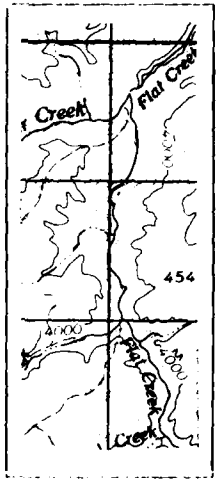
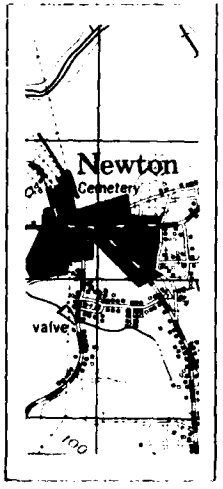
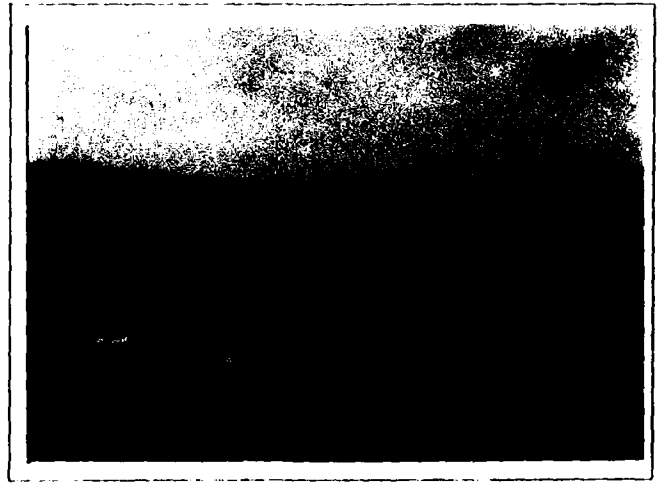
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
SADDLE	A dip or low point along the crest of a ridge. A saddle is not necessarily the lower ground between two hill tops; it may simply be a dip or break along an otherwise level ridge crest.		
SANDBAR	A bar or ridge of sand built up to, or near, the surface by water currents in a river or by tidal and wave action in coastal waters.		

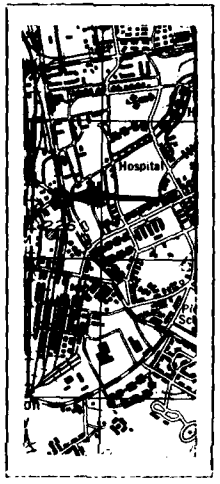
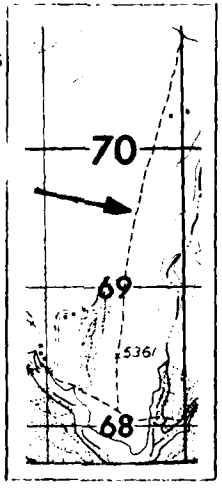
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
SAND DUNE	A ridge or mound of loose wind-blown material, usually sand.	Not Available	
SCHOOL	A building which serves as an institution for academic learning, normally may be further recognized by atheletic fields and/or playgrounds.		

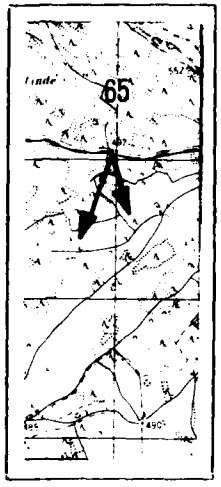
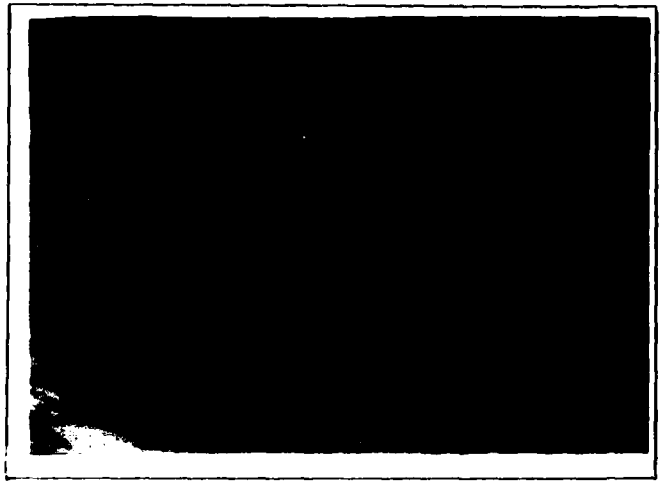
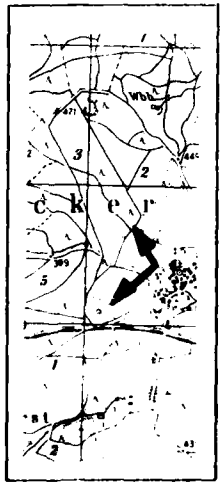
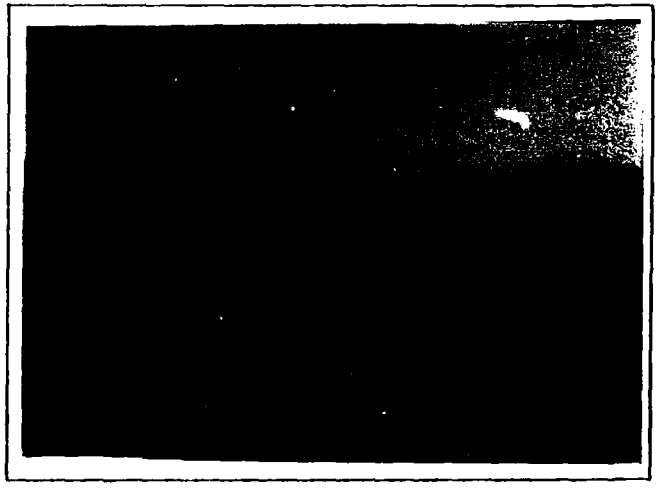
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
SHORELINE	The line where the land (shore) and water meet.		
SILO	A tall, narrow, cylindrical tower-like structure normally located on a ranch or farm.		

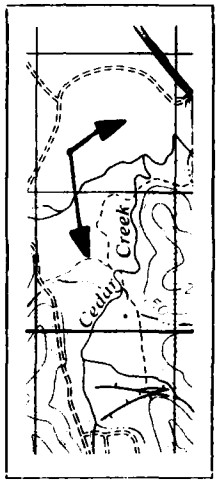
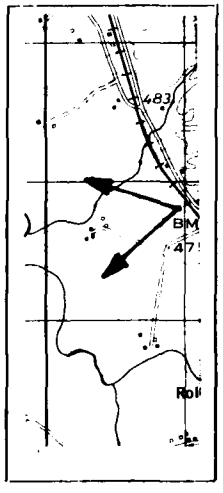
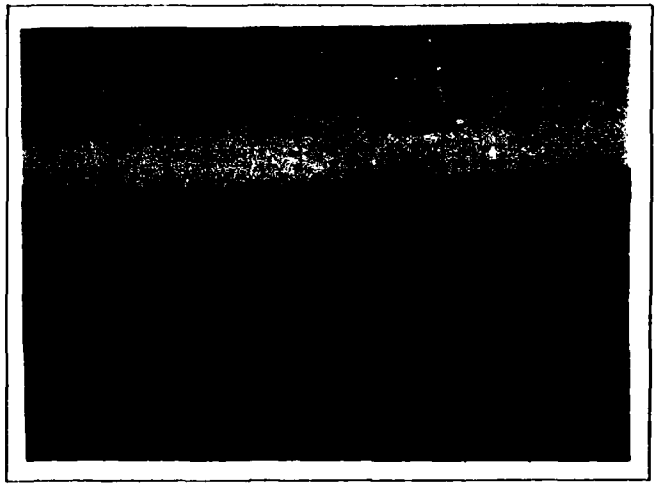
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
SPUR	A continuously down-sloping line of higher ground normally jutting out from the side of a ridge. A spur is often formed by roughly parallel streams cutting draws down the side of the ridge.		
STORAGE TANK (See Silo)	A large cylindrical shaped structure for holding a liquid or gas. A storage tank is differentiated from a silo in that it is normally wider.		

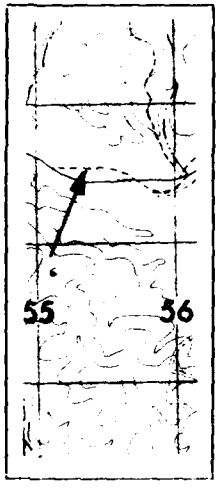
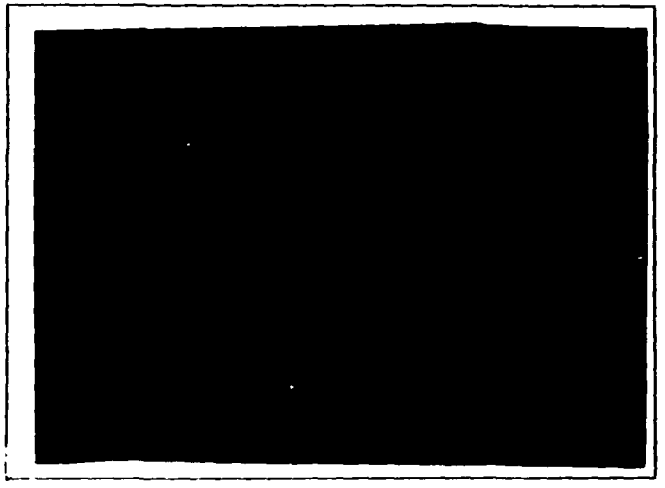
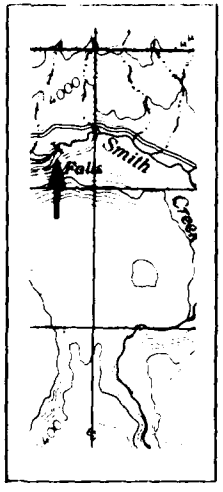
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
STREAM (See Creek)	A body of flowing water with a volume less than a river. A stream is normally not as wide or as deep as a river. A stream is regionally referred to as a "creek."		
SWAMP	An area of water saturated ground dominated by shrubs, grasslike aquatic plants and trees.		

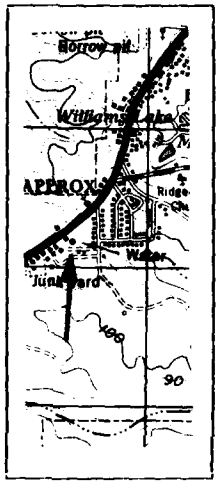
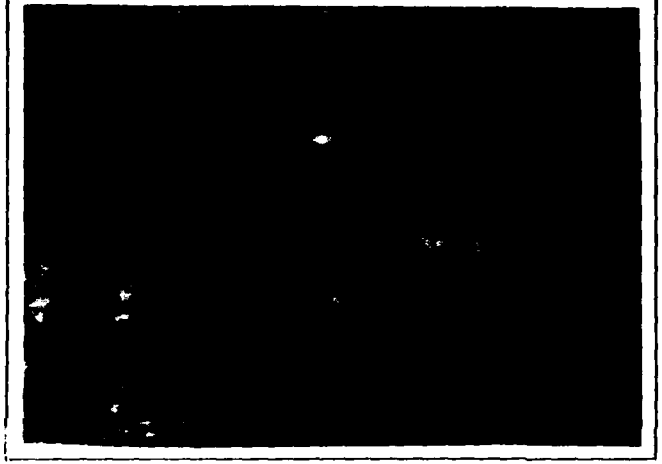
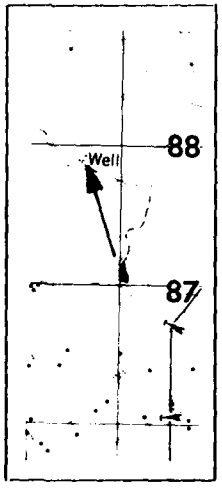
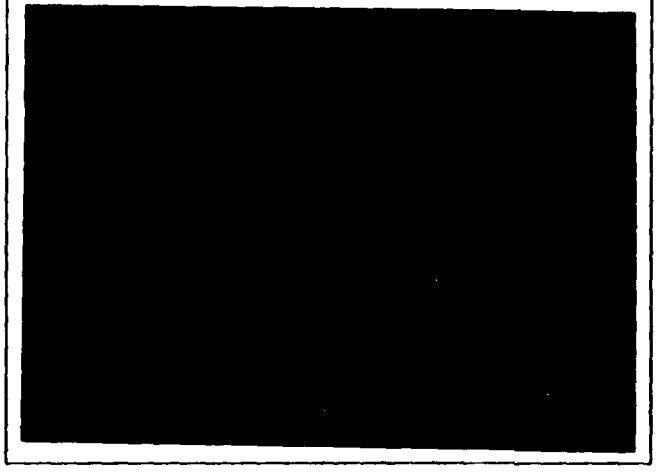
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
TERRAIN (See High Ground, Low Ground)	A general term used to describe the natural features of a tract of land.		
TOWN	A built-up area comprised of many types of residential and business buildings.		

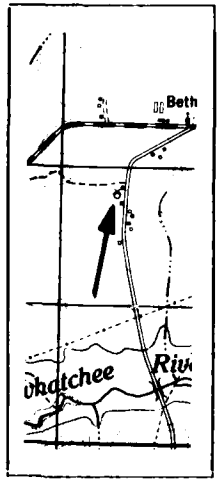
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
TRAFFIC CIRCLE	A rotary placed at an intersection of two or more roads in order to facilitate the passage of vehicles from one road to another.		
TRAIL	An unimproved road that is seldom maintained. Included in this category are logging trails, fire roads, abandoned roads, foot, pack and animal trails.		

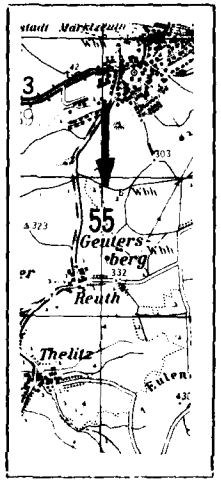
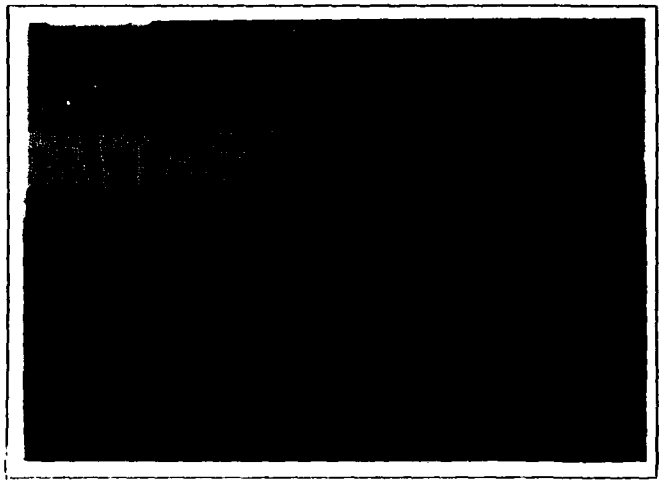
NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
TREE	Woody plant at least 10 feet in height, usually having one main stem.		
TREELINE	A line formed by the trees along the edge of a forested or wooded area.		

NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
VALLEY	Reasonably low level ground bordered on the sides by higher ground. A valley area generally has maneuver room within its confines. On a map the contours indicating a valley are "U" shaped.		
VEGETATION	Plant life, i.e., trees, shrubs, grasses and crops.		

NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
WASHOUT	An area along a creek, river or stream that was eroded and widened by flooding, but presently the eroded area has no water flowing in it.		
WATERFALL	Falling or cascading water from a creek, stream or river going from a higher to a lower elevation.		

NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
WATER TOWER	A tower type structure raised above the ground level, used for storing water.		
WELL	A hole or shaft sunk into the earth marked by a superstructure (e.g., pump or tower).		

NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
WINDMILL	A wheel of blades attached to an elevated structure. Typically located on a farm or ranch.		
WIRE	A term commonly used by helicopter crews to describe electrical and telephone lines strung on wooden poles, most commonly seen along roadways and connected to buildings. The term "wires" should also be announced to alert the pilot that an immediate evasive action may be required to avoid such approaching hazards as communication wires, powerlines TOW missile guidance wire or wire barriers which may not have been observed.	Not Available	

NAME	DEFINITION	MAP REPRESENTATION	PICTORIAL REPRESENTATION
WOODED AREA (See Forest)	A small land area covered with trees.		

4.0 REFERENCES AND RELATED DOCUMENTS

4.1 Field Manuals (FM)

FM 1-51	Rotary Wing Flight
FM 1-80	Aerial Observer Techniques and Procedures
FM 21-26	Map Reading
FM 21-31	Topographic Symbols
FM 21-33	Terrain Analysis
FM 30-10	Military Geographic Intelligence (Terrain)

4.2 Training Circulars (TC)

TC 1-10	Mountain Flying Sense
TC 1-12	Cold Weather Flying Sense

4.3 Joint Chiefs of Staff Publications (JCS Pub)

JCS Pub 1	Dictionary of Military and Associated Terms

4.4 Other References

American Geological Institute. Dictionary of geological terms. Garden City, New York: Doubleday Publishing Company, 1962.

Department of Defense. Glossary of mapping, charting and geodetic terms. Washington, D.C.: U.S. Government Printing Office, 1973.

Stiegeler, S.E. Dictionary of earth sciences. New York: Pica Press, 1977.

The Random House college dictionary (Rev. ed.). New York: Random House, 1979.

U.S. Army Aviation Center. Map interpretation and terrain analysis course: units 14-26, Fort Rucker, Alabama.

Webster's third new international dictionary of the English language (unabridged). Springfield, MA: G. C. Merriam Company, 1976.

5.0 ALPHABETICAL INDEX

An alphabetical index is provided as a convenience in locating descriptive terms and procedures.